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JOHN COWAN,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Fruit Fly.

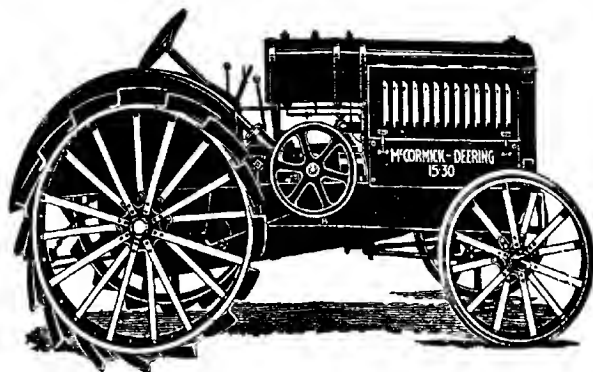
The existence of the Mediterranean fruit fly in States neighbouring South Australia constitutes an ever present source of possible infestation, and from time to time no little public alarm is caused by the appearance of the pest so near the State's borders as to present an imminent menace to the fruit industry. Whilst these periodic scares are not without their value as a means of impressing on the public the need for the utmost care if this and similar insect pests are to be excluded from the State, it is reassuring for them to know that the Horticultural Branch of the Department of Agriculture has for many years maintained an unceasing vigil to that end.

To protect the industry in this State, the introduction of fruit from States which already have this pest in their orchards is restricted to certain "places of entry" where inspectors are on the lookout. The great bulk of the fruit imported in South Australia arrives by sea at Port Adelaide or by rail at Mile End. At both of these places the Horticultural Branch of the Department of Agriculture has established depots, and all consignments of fruit are immediately transferred from boat or train to one of these depots, where they are put through a stringent examination, and, if found to be infected, are held in strict quarantine. An additional safeguard lies in the fact that no fruit is admitted from another State in which this particular fruit fly is established in the orchards unless it is accompanied by a certificate, signed by an Inspector of Orchards stationed in the district where the fruit is grown, declaring that the orchard in question and all the land within five miles of that orchard are absolutely free from the Mediterranean fruit fly and have been so for a period of at least two years prior to the date of the signing of the certificate.

Subterranean Clover.

Known for a long period as a roadside weed in Central and Southern Europe, subterranean clover has in certain parts of South Australia recently proved to be a valuable fodder. It has revolutionised the farming practices of some districts of the State, and has converted many farms, on which it has been difficult to make profits by other means, into valuable sheep propositions. To meet the growing demand for information with respect to this fodder the Department of Agriculture has issued a bulletin, in which the author, Mr. W. J. Spafford (Superintendent of Experimental Work), describes the plant, details its climatic and soil requirements, and explains cultivation practices and methods of handling it.

By way of preface, Mr. Spafford pays a tribute to the efforts of Mr. A. W. Howard, of Mount Barker, South Australia, to popularise the plant. "The credit for discovering, proving, and giving publicity to this really important fodder is practically wholly due to Mr. Howard, whose efforts for a period of more than 30 years in this direction are now being appreciated in all of the States of the Commonwealth and in many other countries of the world," he says.



McCormick-Deering Tractors.

THE McCormick-Deering Tractor is well adapted to farm work. It is equipped with a vertical 4-cylinder valve-in-head engine, which operates economically on kerosene and other low-priced fuels. The cylinders are cast separately and fitted into the engine block, so that they may be easily removed and replaced in case they become scored or worn. The Tractor is equipped with high tension magneto, with impulse starter, has a throttle governor, and the principal bearings throughout the entire machine are roller and ball. A belt pulley of large diameter on the right side of the machine is conveniently placed for belt work, and can be started or stopped from the driver's seat, independent of the engine. Three forward speeds, 2, 3, and 4 miles an hour, and reverse.

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After discussing the botanical characters of the plant, Mr. Spafford explains that in South Australia the seed germinates with the fine autumn rains which are heavy enough for the purpose, and which usually occur in April or early May. The young plants make some growth during the winter period, and by the end of August will have produced a thick mass about 4in. in height. When the warm weather of spring arrives they grow very rapidly, and remain green, and continue growing until really hot weather is experienced, after which they dry up. This characteristic of slow growth in winter, rapid growth in spring, and maturing when hot weather is experienced means that full returns from this clover can only be secured in those districts having a long spring period. In South Australia most of that part of the country which has an average annual rainfall of more than 20in. has a sufficiently good climate to grow subterranean clover well. It will withstand a fair amount of excessive wet and the ordinary cold of winter, hence maximum results are secured in those districts with an annual average rainfall of from 30in. to 40in. and a growing period of about nine months between the autumn rains and the really hot, dry weather of summer, providing always that the seed germinates before the cold weather of winter arrives.

Subterranean clover appears to be able to accommodate itself to almost all types of soil, and given suitable climatic conditions and sufficient phosphoric acid will grow well in calcareous and in sour soils, in most clay soils, in all sands, and in peaty soils, but gives best returns in good, well-balanced loams possessed of good natural drainage. In this State one of the few types of soil in which the clover does not thrive well is the black, clayey soil forming part of some of the "crab-hole" land of the South-East, but the extent of the country containing this soil type is so limited that it is not worth much consideration. Much of the value of this clover depends on the fact that, provided phosphoric acid is supplied to the soils, it will grow extremely well on really "sour" soils, whether they be poor, whitish sands, clayey soils containing much ironstone, or really fertile loams. The poorer types of "sour" lands are usually fairly plentiful where heavy annual rainfall and temperate climate are the rule, and it is not an easy matter to produce profits from the ordinary well-known crops on such soils, but subterranean clover flourishes in them to the exclusion of practically all other plants.

The bulletin referred to deals exhaustively with cultural practices. By way of summary it may be mentioned that the seed should be sown in time to germinate before the cold weather of winter sets in. It may be drilled into the soil or broadcasted on the surface and then worked into the land, but shallow seeding is essential. Good soil preparation is necessary if a proper stand is required in the first year, but the seed can, under some circumstances, be sown with another type of crop or drilled into "grass" land without previous cultivation. For a full crop 6lbs. of seed should be used. If it is put in with a cereal crop 2lbs. will suffice, and when seeded into soil not previously prepared 4lbs. to 6lbs. will be needed. Mr. Spafford emphasises the fact that it is almost impossible to grow subterranean clover well in soils of districts with temperate climates unless plenty of phosphoric fertiliser is used. For high returns he considers the

equivalent of 2cwts. superphosphate (36 per cent.) per acre per year should be applied. At present, the application of 1cwt. superphosphate (45 per cent.) and 10cwts. finely ground raw rock phosphate (82 per cent.) per acre once every 12 years is possibly the cheapest way to apply the phosphoric acid. All manuring should be done in the early autumn. It is stated that the clover can be used with advantage to livestock, when green, as hay or as "dry" feed. It is a good soil renovator, collecting nitrogen and increasing the organic matter content of the soil, and a good soil cleaner, choking out most of the ordinary farm weeds.

The "Salt Cure" for Woolly Aphis.

The contention that applications of crude salt to the soil in the neighborhood of apple trees would effectively control woolly aphis has been put to the test in the Government Orchard, Blackwood, this season by the Horticultural Instructor (Mr. Geo. Quinn). Trees were treated with dressings of salt, varying from 4lbs. to 14lbs. According to the Manager of the Orchard (Mr. R. Fowler) the trees are still badly infested with the aphis, and they are now rather sickly in appearance, due probably to the combined effects of the aphis and the salt. It is also noticeable that the fruit is falling more readily from trees which have been subjected to the salt treatment than those untreated.

Veitch Experimental Farm.

The Government Experimental Farm, Veitch, is situated in the hundred of Allen, 158 miles from Adelaide, on the Loxton railway. It consists of about 3,800 acres of land, the bulk of which is sandy, the remainder running to shallow, light loam soils overlying hard limestone rock—conditions similar to acres of thousands of surrounding country. Since 1909 the average annual rainfall recorded on this farm was 13in. For the same period the average "useful rainfall" (April to November) was 9.66in. During the season just closed, however, the rainfall was 13.33in., and the fall of "useful rain" 11.75in. The cereal yields for the season were considerably above the average.

In commenting on the cropping, the Manager of the Farm (Mr. L. Smith) states that the bulk of the area seeded was put in dry during April and May. Good germination resulted after the first rains on May 6th. Heavy winds during June and July, which caused a sand drift and cut the young crops in some parts, and a dry October, reduced the yields somewhat. The hay cut for the season was taken from 71.54 acres sown with Cumberland, Baroota Wonder, Late Guyas, and King's Early wheats. From this area a total of 150 tons of hay was cut, the average working out at 2 tons 1cwt. 105lbs. per acre as against an average for the farm for the past 14 years of 1 ton 2cwts. 20lbs. Of oats, 116.59 acres were harvested for grain. These were sown on fallow at the rate of 40lbs. of seed per acre, with 1cwt. of superphosphate. Seven varieties were grown, the average yield being 1bush. 24lbs. as compared with an average for the past eight years of 17bush. 30lbs. The yields of the individual varieties were as follows:—Scotch Grey, 29bush. 24lbs.; Early Burt, 23bush. 39lbs.;

Rua Kura, 22bush. 4lbs.; Kelsall's, 18bush. 18lbs.; Algerian, 15bush. 28lbs.; Kherson, 12bush. 16lbs.; Lachlan, 9bush. 33lbs. Mr. Smith is of the opinion that of the varieties tried on this farm Early Bar and Rua Kura are the most suitable for the district, for the reason that they can be harvested and cleaned up out of the way before the other cereals are ripe. Scotch Grey has proved a good oat and consistent grain yielder, but is rather short in the straw for hay purposes. The barley crops harvested for grain, 78.47 acres, were grown on fallow land. The grain was sown at the rate of 50lbs. to the acre, with a dressing of 1cwt. superphosphate. The average yield was 23bush. 38lbs. as compared with 16bush. 50lbs., the average for the past nine seasons. Wheat was grown on fallow and on "new" ground. The fallowed land was seeded with 60lbs. of grain and 1cwt. superphosphate per acre, and the "new" land with 60lbs. of seed and 75lbs. of superphosphate. In all 23 varieties were grown, the average yield being 17bush. 24lbs. The average wheat yield of the farm for 15 years is 11bush. 19lbs. The varieties which yielded 15bush. or more per acre are:—Sultan, 25bush. 34lbs.; Walker's Wonder, 24bush. 29lbs.; Red Russian, 23bush. 15lbs.; Maharajah, 20bush. 25lbs.; Canaan, 20bush. 6lbs.; Triumph, 19bush. 11b.; Queen Fan, 18bush. 28lbs.; Rajah, 17bush. 43lbs.; Gluyas Late, 17bush. 9lbs.; Cumberland, 16bush. 41lbs.; Gluyas Early, 15bush. 21lbs.; Caliph, 15bush. 11b. These, with Baroota Wonder, are, in the opinion of the Manager, "worth a place on any mallee farm."

The experimental work being conducted on this farm includes—(a) A series of manurial plots with wheat being worked on the following rotation:—(1) Pasture; (2) bare fallow; (3) wheat. (b) Plots designed to test different methods of cultivating bare fallow for wheat, and worked on the following rotation:—(1) Pasture; (2) bare fallow; (3) wheat. (c) Manurial and cultivation tests with six-rowed barley. (d) Quantitative seeding tests with wheat and barley.

Success with a French Barley.

With the object of introducing into this State varieties of barley likely to prove more profitable than those generally grown, the Department of Agriculture in 1921 imported seed of different sorts from New Zealand, Great Britain, and France. These were sown in Millicent during the 1922 season, and portion of the grain grown there was made available to South Australian barley growers. Amongst those who secured seed of one type—the French variety "Albert"—was Mr. S. J. Binney, of Glencoe East. Mr. Binney sowed one bag of this variety, and in a communication recently received by the Department of Agriculture he commented on the crop as follows:—"The barley did remarkably well, making good strong growth. It was up to my shoulders and was much admired by all who saw it. When it was cut for threshing it took over three balls of twine for the three acres. One bag of grain yielded 41 bags of barley, approximately 45bush. per acre. The total yield was 135bush. Some of it was cut on the green side to save it from the caterpillars. Duckbill growing alongside only yielded 35bush. per acre, and I estimate the Albert would have yielded 50bush. had it

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not been attacked by caterpillars. I had a bag crushed for feed, and it exceeded my expectations in the crushing by yielding a better meal than Duckbill." Mr. Binney further mentions that he proposes to grow Albert in place of Duckbill for his place during the coming season.

Planting Fruit Trees.

For a number of years past the Horticultural Branch of the Department of Agriculture has carried out tests in the experimental orchards with the object of determining the best time of the year to transplant deciduous fruit trees. These tests show that in the average season there is a decided advantage to be secured by transplanting trees and vines into their permanent positions in the early autumn season, even though it may be necessary to lift the plants from the nursery before the leaves have fallen to any extent. The exception is when the rainy season occurs later than usual. Records indicate that the soil temperature has a tendency to fall much lower when the ground remains dry until May and June, consequently, trees and vines transplanted under such conditions do not make so much growth to take the place of roots broken at the time of removal from the nursery. These trials have revealed that whereas the leaves may drop from the trees after transplanting takes place, the root system will start into activity and produce quite a strong growth before the ground becomes too cold, although no evidence of this growth is detectable on the plant above the ground. To the extent to which this operates can be gauged from the fact that a young Cleopatra apple tree transplanted in May under favorable conditions produced over 460 in. of new root growth within a period of eight weeks.

Fruit Export.

Up till the middle of March the Inspectors of the Horticultural Branch of the Department of Agriculture, who are also Examining Officers under the Commerce Act, dealt with 36,528 cases of apples and 15 cases of pears for export. In general the fruit was of excellent quality, clean and free from disease, but, unfortunately, some thousands of cases have been rejected, and have either to be marked down in grade or to be resorted before being shipped, because the growers have neglected to make themselves acquainted with the requirements of grading regulations. They have submitted apples varying between 2 in. and 3 in. in diameter in one case, which is a contravention of the regulation which requires uniformity of size of fruit within the range of $\frac{1}{4}$ in. in any one case in any grade. From the point of view of quality, however, it may be stated that amongst the consignments there have been instances where a good deal of the fruit which was branded "standard" might well have been classed as "special," which is the highest grade. The Horticultural Instructor (Mr. Geo. Quinn) remarked that the fruit best exported is very typical of the quality of the apples which are now seen throughout the State this season, and it is very unlikely indeed that anything coming under the more recently declared grade "blemished" will be exported from this State.

POWER FARMING

The Question of the Hour.

Below we give a further list of questions put to us by farmers, and our replies are added thereto.

Question—What advantage and what profit may I expect to gain from the use of a CASE Tractor?

Answer There are many different ways in which a farmer gains material advantage by the use of a CASE Tractor:—

1. Timeliness.
2. Better work.
3. Increased farming capacity.
4. Belt work.
5. Contract work.
6. Releasing of land for stock raising or marketable crops.
7. Cheaper production.

*The CASE is within your reach.
Read the last question.*

Question—I know it is a big item, but if I got rid of a 12-horse team what would I save in feed?

Answer In the first place, what does it cost to feed a horse? Many farmers say, at least, £30, but let us take it at £20. That means a saving of £240 per year. On top of that, how many hours a day does it take you or your man to water, feed, yoke, and unyoke that team? Farmers throughout the country say four would be a very low average. That four hours represents one-third of a man's working day. If his wages (including board and lodging) are 80s. per week, the value of the time spent in attending to those horses is 4s. 5d. per day, or a sum of £57 8s. 4d., covering a working period of 260 days. This makes a total of £297 8s. 4d., or an expenditure of £5 14s. 4d. per week.

Question—But is that part of a man's time saved if I use a CASE Tractor?

Answer The time now wasted in feeding, &c., is saved by reason of the fact that the man would be occupied working the Tractor on the land, which is a more remunerative operation than feeding.

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SUMMARY OF YEAR'S WORK.

Kind of Work	Quantity.		Time.		Fuel Used.	
	Acres, &c.	Hours.	Kero.	Petrol.		
Cultivated..	814	203½	428	12½		
Fallowed ..	361½	148½	309½	9½		
Cultivated..	728	201½	318½	11		
Reaped	2,810 bags	211½	288½	11½		
Cultivated...	283	74½	109	3½		

Total Cost of Fuel and Oil,
£137 10s.

No repairs were required.

Included among the innumerable unsolicited testimonials we have received from CASE Tractor users all over Australia, may possibly be the experiences of farmers who have had to contend with conditions similar to those on your farm to-day. You can get the benefit of these experiences from our Book of Testimonials, Post Free on Application.

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BRANCHES IN ALL STATES.

POWER FARMING

The Question of the Hour.

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Answer Read the testimonial on the opposite page. Then figure it out and see if you could do the same work with your horses for the same cost.

Question—Is it necessary for me or my man to be motor experts in order to drive a CASE?

Answer Most farmers to-day have some knowledge of mechanical appliances. The CASE is so simple to operate that its mastery is only a matter of a few hours. But the CASE Service Organisation sees the Tractor and its driver started right and kept right.

Question—Will the CASE Tractor do my belt work?

Answer *Farmer's Bulletin 1093*, of the U.S. Department of Agriculture, points out that the following operations are being profitably performed by Tractors:—Threshing, hulling, elevating grain, shredding corn, shelling corn, filling silo, baling hay, sawing wood, operating saw mills, cider mills, feed grinding, pumping water, mixing concrete, hoisting hay, pulverizing lime, and drilling wells. Whilst some of these operations may not be conducted in Australia, they nevertheless show the large possibilities of the Tractor as a source of power for farm work, as well as its adaptability for a large variety of other uses. The CASE Tractor is the only power machine needed on the farm.

Question—Can I obtain a CASE Tractor on terms?

Answer Yes. Further information and copies of unsolicited testimonials may be obtained by writing to

Commonwealth Agricultural Service Engineers, Ltd.,
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Watch for fresh Questions and Answers in next issue.

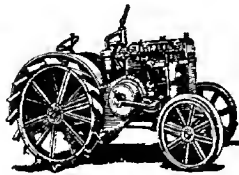
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made in four sizes;
there is one to meet
your requirements.*



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BRANCHES IN ALL STATES.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by MR. ALAN H. ROBIN, B.V.Sc., Veterinary Officer, Stock and Brands Department.]

"C. W. J. Lowndes, has light mare, 7½ years old, with a hard lump on hind shank on the outside of the joint.

Reply—It is doubtful if you will be able to get your mare thoroughly and reliably sound. The most likely treatment to produce desirable results would be to clip the hair over the lump and rub in for 15 minutes a good red blister of strength 1 to 8. A day or so after turn her out for a spell. It may be necessary to repeat the blistering in four to five weeks' time. In order to afford the best chance of recovery it is essential that she be spelled for several weeks during the treatment.

"D. A. S.," Milne, asks treatment for horses with sore shoulders.

Reply—Sore shoulders frequently take a good deal of time to heal up, though, as a rule, they are amenable to treatment. You should bathe them in a 1 per cent. solution of lysol in warm water, and if any of the lumps contain any matter they should be lanced and the matter allowed to get out. Then dress with a fairly strong solution of common salt in water. To assist healing, keep the horses' blood in good order. Give them an occasional handful of Epsom salts in a sloppy feed, or a bran mash, and give each animal 1oz. of Fowler's solution every day for 10 days.

Hon. Secretary, Miltalie Agricultural Bureau, asks why is it necessary to keep rams away from ewes for some days after dipping?

Reply—It is wise to adopt this procedure to prevent sexual intercourse between the rams and the ewes taking place before the fleece has had a chance to dry out after the dipping. If mating occurs while the fleece is dripping wet with the liquid, some of it may, through contact with the ram, be introduced into the genital passages of the ewes and set up considerable irritation and inflammation. It may similarly cause trouble if it gets on to the uncovered pizzle of the ram.

"O. J.," Hamley Bridge, has young pigs fed on skim milk and barley which have developed lameness in front legs and stiffness in hindquarters.

Reply—It is probable that the change of feed consequent upon their change of quarters is affecting the pigs. Make sure that their sties are clean, dry, and warm, and give shelter from winds. Reduce the ration somewhat and feed more on green food slops for a week. Put Epsom salts in the food occasionally, at the rate of one packet per pig, and add 10 to 20 grains of calcium sulphate per pig to the feed night and morning.

"R. H. O.," Clinton Centre, has a mare with gathered udder. The udder is quite hard, and a boil has developed in the lower portion of the leg.

Reply—Commence treatment by giving the mare 1lb. Epsom salts in a drench. Keep her on light diet—sloppy food, with a handful of Epsom salts mixed with it, night and morning. If green feed is available in any form it will be very

helpful. Water the mare from a bucket, and dissolve 1oz. of hyposulphate of soda in the water daily. Local treatment to the udder consists of keeping it thoroughly clean; foment frequently with hot fomenta and gentle massage so long as it remains at all indurated. Provide drainage for any matter that forms, and syringe out the abscess cavity daily with a solution of iodine 1 part, potass. iod. 3 parts, boiled water 100 parts.

Hon. Secretary, Agricultural Bureau, Shoal Bay, asks is smutty wheat injurious to stock.

Reply—Smutty wheat, if fed to stock, is liable to produce gastric and intestinal disorders.

A. W. W., Parilla, asks:—(1) Suitable lick for horses and cattle; and 2. remedy for horse with fleshy growth in corner of eye.

Replies—(1) A suitable lick for horses and cattle may be compounded as follows:—Common salt, 12 parts; ground bone meal, 6 parts; superphosphate, 6 parts; powdered sulphate of iron, 1 part. (2) Your horse has a growth in the corner of the eye which is frequently erroneously called a cancer. There is only one treatment for it and that is operation. If your horse is at all valuable you should obtain the services of the veterinary surgeon at Pinnaroo to perform the operation, which is not very difficult nor serious if attempted before the growth becomes too big.

Hon. Secretary, Rapid Bay Agricultural Bureau, asks for a suitable dressing for making hair grow on a horse with broken knees.

Reply—As a rule, when a horse suffers from the disability of broken knees, the natural skin and hair follicles over the parts are destroyed. The scar which remains after healing is not normal skin and does not contain any hair follicles, consequently there is no remedy of any avail to promote growth of hair to cover up the blemish.

The Improved McGillivray Patent Rotary Grain Pickler.

WET OR DRY.

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That ensures every grain is WELL RUBBED in pickle. No need to worry, you cannot over or under pickle, as you have the same QUANTITY and STRENGTH to every bag (3 quarts), not gallons. The only pickler to do this.

This machine is always clean, and ready to be put away when finished pickling.

No high lifting of bags—2ft. 6in. at most. A lad can operate it, and pickle thoroughly 18 or 20 bags per



hour. For speed, efficiency, economy, and simplicity, this machine stands alone.

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AGRICULTURAL ENGINEERS.

ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT, 1923-1924.

By W. J. COLEBATCH, B.Sc., M.R.C.V.S., Principal; R. C. SCOTT,
Experimentalist, and E. L. ORCHARD, Farm Superintendent.]

The year 1923 will go down in history as one of the most remarkable ever experienced by South Australian farmers. Those who were fortunate enough to have rising land in fallow, harvested bumper yields from early sowings. Good crops were also secured from late-sown fields, but except in light-soil districts very poor returns were, as a rule, garnered from crops sown mid-season. On many farms in the northern wheatgrowing areas the season has been responsible for both heavy and light yields, but, generally speaking, the season has not been conducive to heavy average grain returns. Examples of prolificacy are frequent, but, notwithstanding these, it must be admitted that large areas of prepared land were perforce allowed to stand over without being sown, and, further, many acres of sown land were ultimately abandoned as crop, and given over to livestock. These experiences were due to the erratic nature of the weather. At the College we have found it most difficult to adjust operations to suit the vagaries of the climate.

Starting early in the year—April—we made a good beginning, and, despite the heavy rains that fell in May, very good progress was made by utilising our full strength whenever opportunity offered. The monotonous succession of soaking showers that followed in June and July, however, wrought havoc, and prevented the completion of the topping programme. For the first time since 1904 it was found impossible to seed successfully the permanent experimental plots; similarly the area set aside for barley had finally to be added to the fields listed for fallowing, and in consequence there are no farm barley crops to report on this year.

From the subjoined table the effect of the season on grain and produce yields can be gauged by comparing the annual and mean returns.

TABLE I.—*Showing Crops Returns for 1923 Comparative with Mean Yields.*

Crop.	Period.	Mean Yield.		Average Yield.	
		Bush.	lbs.	1923.	Mean.
Wheat	1904-1922	17	42	15	41
Barley	1904-1922	28	44	19	37
Oats	1905-1922	23	22	20	22
		T.	C.	T.	C.
Hay	1904-1922	2	0	96	2
Ensilage	1905-1922	6	15	12	6
Berseem	1912-1922	29	16	53	30

WEATHER CONDITIONS.

The table shown below is included to indicate the total amount of rainfall for the past season in comparison with that of the five wettest years previously recorded here since 1883.

TABLE II.—*Showing Total and Monthly Rainfall Registered in the Six Wettest Years at Roseworthy College since 1883.*

	1916.	1910.	1909.	1889.	1890.	1923.	Mean. 1883-1922.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
January	1.15	1.72	0.75	2.24	3.17	0.47	0.80
February	0.16	—	0.28	0.07	3.10	—	0.60
March	0.62	4.43	1.17	0.62	1.10	0.02	0.84
April	1.36	0.23	1.91	7.19	0.88	0.10	1.52
May	0.88	3.20	2.89	1.78	1.62	6.01	1.87
June	5.18	2.81	1.84	3.39	4.18	5.03	2.56
July	2.75	2.86	3.80	0.95	4.21	4.48	1.85
August	3.00	1.32	4.56	3.03	3.04	2.42	2.06
September	1.82	2.64	1.52	2.21	1.41	4.73	1.81
October	1.65	2.55	2.55	2.73	2.69	2.17	1.64
November	3.61	1.18	2.08	1.39	1.95	0.36	1.07
December	1.05	0.93	0.70	0.14	0.23	1.67	0.88
Totals	23.23	23.87	24.05	25.74	27.58	27.46	17.51

It will be seen that the past season ranks second to the year 1890 in point of total rainfall, but the difference is only 12 points, and strangely enough, 27 points were registered before the new year was two days old. The outstanding feature of 1923, however, is the enormous amount recorded in the three seeding months—May, June, and July. No less than 15½ in. fell during this period, whereas the highest corresponding figure in the above table is 10 in., registered in 1890. Consideration of this point brings us to the subject of rainfall distribution, and reference to the particulars given in the appended table will show clearly wherein the past season failed to satisfy the demands of the wheatgrowers in this locality.

TABLE III.—*Showing the Distribution of "Useful Rain" in the Years 1917-1923, Inclusive, Together with the Means for the Previous 30 Years.*

	Seeding. Rains. April-May.	Winter. Rains. June-July.	Spring. Rains. Aug.-Oct.	Summer. Rains. November.	Totals.	Percentage of "Useful" to Total Rain.
	In.	In.	In.	In.	In.	In.
1917 . . .	4.66	4.09	7.32	1.18	17.25	78.91
1918 . . .	3.38	2.58	4.19	0.38	10.53	87.68
1919 . . .	1.73	1.73	4.70	0.05	8.22	66.40
1920 . . .	2.16	5.56	7.16	1.88	16.76	86.84
1921 . . .	3.14	3.38	4.81	1.65	12.98	75.64
1922 . . .	4.49	5.48	4.91	0.02	14.90	74.50
1923 . . .	6.11	9.51	9.32	0.36	25.30	92.13
1883-1922	3.39	4.41	5.52	1.07	14.36	82.01

The "total useful" rain registered in 1923 constitutes a new record, the highest previously noted being 22.67in. in 1889. Never before in the history of the College have the useful rains interfered so seriously with cultural operations. In 1889 no less than 7.19in.—almost one-third of the "useful rain" for that season—fell in the month of April, whereas almost the whole of the 1923 "useful rain" came down during the normal growing stages of the crops. The fall in May—6.01in.—was exceeded by 0.53in. in the year 1883, and the June fall was beaten by 0.15in. in 1916. New maxima were established for July and September during last season, and it will be noted that the percentage of "useful" to "total" rainfall is exceptionally high.

TABLE IV.—*Showing Fallow Rains, August 1st of One Year to March 31st of Succeeding Year, Together with the Corresponding Mean for 39 Years. 1883-1922.*

Season.	In.	Season.	In.
1904/1905	7.18	1914/1915	3.86
1905/1906	7.96	1915/1916	9.08
1906/1907	11.29	1916/1917	14.79
1907/1908	9.13	1917/1918	10.83
1908/1909	9.51	1918/1919	5.45
1909/1910	17.56	1919/1920	7.27
1910/1911	11.41	1920/1921	13.78
1911/1912	5.88	1921/1922	7.51
1912/1913	13.00	1922/1923	9.32
1913/1914	13.07		
Mean		1883/1922	9.66

By comparison with the mean figure shown above, namely, 9.66in., the past season would appear to have been fairly normal in respect of fallow rains, but here again our grievance is against the distribution rather than the total amount of rain. Nearly 4in. were measured in December, and approximately 5in. fell prior to the December down-pour. In the early part of 1923, however, less than half an inch

arrived to freshen the fallow fields and pave the way for the cleaning operations. Between January 25th and May 4th only 12 points of rain were gauged, and in consequence the condition and compactness of the fallows left much to be desired.

TABLE V.—*Showing Details of Weather for the Year 1923.*

Month.	Rain-fall.	No. of days on which rain fell.	Important Rains.		Minimum Temperature.	Mean minimum Temperature.	Frosts.		Maximum Temperature.
			Date.	Ins.			Date.	Temp.	
January . . .	0.47	7			46.0	58.20			111.00
February . . .	0.00	0			47.0	60.20			109.50
March . . .	0.02	1			45.2	53.30			94.00
April	0.10	2			44.8	54.40			92.00
May	6.01	21	8	0.90	49.0	53.85			84.00
			20	0.75					
			21	0.65					
			27	0.65					
			29	0.78					
June	5.03	25	5	0.43	40.0	46.83	26	31.2	72.00
			10	0.55			28	31.5	
			12	0.48					
			16	0.70					
			24	0.81					
July	4.48	22	6	0.64	37.5	44.63	7	30.5	67.00
			19	1.09			26	31.0	
			23	0.48					
			30	0.63					
August . . .	2.42	18	1	0.61	36.00	44.13	5	29.0	72.00
			2	0.22			7	29.0	
			29	0.21			17	29.0	
			30	0.41			19	31.0	
							20	29.5	
September . .	4.73	18	16	0.45	39.00	44.67	1	39.5	80.00
			20	1.23			4	31.0	
			21	0.60			6	32.0	
			22	0.44			8	28.0	
			24	0.45					
			28	0.47					
October . . .	2.17	15	11	0.56	39.8	49.13			93.00
			17	0.24					
			25	0.22					
			30	0.25					
November . .	0.36	7	17	0.21	37.5	48.59			100.00
December . .	1.67	11	5	0.27	44.5	57.90			106.00
			14	0.64					
			18	0.31					

Amongst other facts of interest that may be gleaned from the foregoing summary may be mentioned the number of days on which rain fell—147 in all—and the absence of severe or prolonged frosts to harden the crops and check proud growth.

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1921	36,780	"	13,220	"
1922	68,985	"	23,015	"

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BERSEEM CLOVER.

Slightly more than $3\frac{1}{2}$ acres were devoted to Berseem clover last year, but one plot was so damaged by floodwaters that it had to be abandoned as far as records are concerned. Portions of one of the plots which is given over to trials with varying amounts of seed are also excluded from the mean figures, but particulars covering the yields obtained from them are given in a separate table. This crop is grown under irrigation, and in wet years it usually makes growth quite as rapidly as in dry seasons, when the rainmakers are in regular use. A season like 1923, however, affects even irrigated crops to a certain extent. Incessant showers cause the crop to go down, and when the strengthening influence of the sun is denied for days and weeks together the stems soften and rot off at the bend, and both yield and quality of forage are reduced. It is probable that in seasons of phenomenally heavy rainfall the feeding value of this clover is lowered in proportion as the water content is raised, and from this point of view more satisfactory results are obtained when artificial irrigation is needed to supplement the natural rainfall, but from the economic standpoint the nearer the natural fall to the demands of the crop for moisture, the better, provided it is distributed in a manner that permits of strong healthy growth. In 1923 the only irrigations given were the preparatory watering during and after seeding, and the application due two to three weeks later. The yield obtained over the total area of approximately 2 acres was 59 tons 17cwt. 9lbs. Full particulars are set out below:—

TABLE VI.—*Showing Yields of Berseem Clover (Trifolium Alexandrinum) at Roseworthy College, 1923.*

	Total Yield.			Acre Yield.		
	T.	C.	L.	T.	C.	L.
Plot H (1.02 acres)—						
May 28-June 24	9	11	31	9	7	59
July 25-August 29	10	9	88	10	5	75
September 24-October 16	7	5	16	7	2	33
November 9-17	4	2	9	4	0	33
	31	8	32	30	15	105
Plot A (0.75 acres)—						
July 7-August 16	8	16	56	11	15	37
October 10-25	9	1	17	12	1	60
November 17-25	4	11	38	6	1	88
	22	8	111	29	18	73
Plot N (0.20 acres)—						
June 7-July 6	2	11	100	12	19	52
August 17-September 8	2	16	20	14	0	100
October 8-November 16	0	12	52	3	2	36
	6	0	60	30	2	76
Totals, 1.97 acres	59	17	91	30	8	3

TABLE VII.—*Summarising Returns from Irrigated Berseem at Roseworthy College, 1912-1923.*

Year.	“Useful” Rain.		Total Yield.			Acre Yield.		
	Inches.	Acres.	T.	C.	L.	T.	C.	L.
1912	13.05	1.190	38	12	56	32	9	18
1913	10.82	3.201	108	19	97	34	0	111
1914	6.12	2.294	46	16	94	20	8	43
1915	18.35	3.411	98	16	66	28	19	53
1916	20.25	4.643	165	1	48	35	11	6
1917	17.25	4.003	115	16	53	28	18	12
1918	10.53	3.693	107	18	93	29	4	64
1919	8.22	3.384	96	1	108	28	7	107
1920	16.76	1.368	39	7	21	28	15	48
1921	12.98	1.580	48	0	108	30	19	57
1922	14.90	3.963	120	3	103	30	6	66
1923	25.30	1.970	59	17	91	30	8	3
Means or 12 years						29	17	40

Further tests were made with a view to ascertaining the optimum amount of seed to sow to the acre. Experiments to this end were started in 1921, the quantities of seed used being 15lb., 20lb., 25lb., and 30lbs. Similar trials were conducted in 1922, but last year the 15lbs. plot was omitted, and one in which 35lbs. per acre were sown was substituted for it. In every instance, so far, the yields have improved with the addition of more seed, but the increase obtained from the 35lbs. plot last year was less than 2½cwt. Allowing 2s. per lb. for the seed, this small quantity of green fodder would require an outlay of 10s. an acre, which is more than it is worth. We must refrain, however, from the temptation to base deductions on a single test. The scheme will be carried out again next year, and if better conditions prevail it will be interesting to compare the harvest results with those now under review.

TABLE VIII.—*Showing Yields of Berseem Clover obtained from Light and Heavy Seedings.*

Number of Cut.	1921.			Yield per Acre.						Average Yield per Acre, 1921-1923.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
20lbs. of seed per acre—												
First cut . . .	7	17	23	13	3	107	12	0	50	11	6	97
Second cut . .	9	15	17	13	8	47	13	4	62	12	2	79
Third cut . . .	2	17	45	6	6	13	2	1	108	3	15	18
	20	9	85	32	18	54	27	6	108	27	4	82
25lbs. of seed per acre—												
First cut . . .	8	6	51	14	10	33	12	15	100	11	17	61
Second cut . .	12	5	60	14	10	20	13	19	12	13	11	68
Third cut . . .	2	9	48	5	17	84	3	1	98	3	16	39
	23	1	47	34	18	36	29	16	98	29	5	56
30lbs. of seed per acre—												
First cut . . .	8	0	9	16	6	51	12	19	52	12	8	75
Second cut . .	12	12	26	17	11	63	14	0	100	14	14	100
Third cut . . .	2	12	69	6	7	14	3	2	36	4	0	77
	23	4	104	40	5	15	30	2	76	31	4	28

TABLE VIII.—*Showing Yields of Berseem Clover obtained from Light and Heavy Seedings—continued.*

35lbs. of seed per acre—	1923.		
	T.	C.	L.
First cut	13	2	6
Second cut	14	2	46
Third cut	3	0	50
	30	4	102

ENSILAGE.

For over 30 years it has been the practice at the College to conserve in underground pits upwards of 100 tons of silage. In 1923 we ensiled 272 tons in the new overhead silos, which have a capacity of 300 tons. They are in the form of reinforced concrete circular buildings, and are located immediately outside the door of the cow byres. The diameter is 18ft., and they stand 35ft. above ground level. Shoots have been placed over the port holes for convenient handling, and a powerful silage cutter and blower have been added to the equipment. Owing to the inclement nature of the weather the erection of these structures was not completed as early as expected, and consequently silage making, which usually takes place about the end of August or early September, was prolonged into November. Ordinarily it would have been difficult to find a crop at the right stage for ensiling at this time of the year, but the lateness of the season enabled us to take advantage of the available space, and accordingly we succeeded in storing ample supplies for the ensuing summer and autumn. The quality of the silage, however, is not quite up to our usual standard, as some of the cereals used were admittedly lacking in succulence. This also accounts for the fact that the actual tonnage blown into the silos was a little below their calculated capacity.

With the addition of the Lincoln Red Shorthorn cattle to our dairy herd the annual consumption of silage will range from 150 tons to 200 tons according to the season. We are therefore now in the fortunate position of being able to save enough silage in one year to permit of a surplus of 100 tons to 150 tons being carried over. It is very desirable that this should be so, for where silage is relied upon regularly for succulent fodder between spring and winter it is just as important to hold a reserve supply to tide over periods of drought as it is to retain a surplus of hay.

With regard to this season's silage crops, chief interest centres round Field No. 1, in which were sown plots of the different cereals on the lines of the experiment started in 1922. This field was under pease the year before, and the stubble was disc-ploughed, cultivated.

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and sown during the second week of May. Wheat (Sultan), oats (Lachlan), barley (Roseworthy Oregon), and rye (Black Winter) were drilled in with 2cwts. of 36/38 grade superphosphate; a plot of wheat and oats in combination (Felix wheat, Sunrise oats) was also included. Unfortunately the postponement of silage making forced us to omit the barley plot from the test. The crop was a good one, but had begun to ripen off several weeks before we were ready to commence cutting. The other plots, however, made exceptionally good growth and yield, much above the general average return obtained here during the previous 18 years. The highest tonnage was gained from the wheat plot, and both wheat and oats separately returned more than a similar area sown with mixed seed. In the subjoined table are shown the results obtained from these test plots in the years 1922 and 1923.

TABLE IX.—*Showing Yields of Silage obtained from Plots of Cereals, 1922 and 1923.*

Crop.	1922 Acre Yield.			1923 Acre Yield.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
Wheat	8	4	41	10	3	15	9	3	84
Barley	7	0	43	—	—	—	—	—	—
Oats	6	17	53	9	14	45	8	3	105
Rye	7	8	98	8	11	29	8	0	8
Wheat and oats . .	8	13	82	9	2	32	8	18	1

TABLE X.—*Showing Yields of Ensilage, 1905-1923.*

Year.	Rainfall.		Area. Acres.	Total Yield.			Yield per Acre.
	"Useful."	Total.		T.	C.	L.	
1905	14.23	16.71	—	—	—	—	8 10 9
1906	16.31	19.73	9.50	113	1	0	11 18 0
1907	13.96	15.13	17.15	92	2	75	5 7 34
1908	15.52	17.75	17.00	129	10	76	7 12 44
1909	21.15	24.05	16.962	169	18	90	10 0 3
1910	16.70	23.87	15.490	134	1	43	8 15 32
1911	9.45	13.68	30.740	152	16	28	4 19 47
1912	13.05	14.97	40.700	141	4	73	3 9 45
1913	70.82	15.66	61.511	115	14	24	1 17 70
1914	6.12	9.36	—	—	—	—	—
1915	18.33	19.76	27.384	153	14	107	5 12 30
1916	20.25	23.23	12.443	103	11	28	8 6 31
1917	17.25	21.86	9.176	77	18	84	8 4 22
1918	10.53	12.01	19.284	91	15	75	4 15 21
1919	8.22	12.38	59.436	116	12	101	1 19 28
1920	16.76	19.30	18.464	140	6	8	7 11 160
1921	12.98	17.16	19.607	141	19	47	7 4 84
1922	14.90	20.00	18.52	155	2	76	8 7 39
1923	25.30	27.46	43.559	272	1	108	6 4 105
Mean for 18 years							6 14 41

HAY HARVEST.

The 1923 hay crops were above normal, the average return over a total area of 196.48 acres, being 2 tons 7cwts. 108lbs., as against a mean yield for the preceding 19 years of 2 tons 96lbs. In all 471 tons of

wheat and oaten hay were saved, and it is of importance to state that the last load was safely in the stack before the December rains fell. There is a tendency in a climate such as ours, in which dry conditions usually prevail, to overlook the importance of securing the hay crop against the injurious effects of summer showers. Rain has a very injurious influence on the quality and feeding value of exposed cereal hay, and if this commodity were sold on a standard of quality serious losses through dockage would be occasioned by delay in storing the stooked sheaves. Everyone will admit freely that in a season such as we have just experienced a proportion of "smoky" hay is unavoidable, but there seems good reason for the conviction that if farmers realised the extent of the damage wrought by the solvent action of rain on hay left lying in the field, and the effect of feeding this relatively unnutritious type of fodder to working horses, more expedition would be shown in the clearing of the hay fields, and more concern evinced when circumstances hinder the completion of the work.

For the sake of comparison the average hay yields obtained at Roseworthy College in each year since 1904, together with the rainfall records, are set out in the following table.

TABLE XI.—*Showing Average Hay Yields on the College Farm, 1904-1922.*

Year.	Rainfall.		Area Acres.	Total Yield.			Average Yield.		
	"Useful" Inches.	Total Inches.		T.	C.	L.	T.	C.	L.
1904	11.66	14.70	93,000	238	0	0	2	11	22
1905	14.23	16.71	67,000	198	8	22	3	2	71
1906	16.31	19.73	93,000	241	0	0	2	11	96
1907	13.96	15.13	51,000	91	14	20	1	15	108
1908	15.52	17.75	112,500	293	6	23	2	7	5
1909	21.15	24.05	145,397	404	4	51	2	15	68
1910	16.79	23.87	94,900	224	7	6	2	7	31
1911	9.45	13.68	200,100	290	12	94	1	8	6
1912	13.05	14.97	248,450	432	7	49	1	14	96
1913	10.82	15.66	258,200	207	7	111	0	16	7
1914	6.12	9.36	247,647	181	13	107	0	14	75
1915	18.33	19.76	341,649	806	7	36	2	7	23
1916	20.25	23.23	121,727	374	17	8	3	1	66
1917	17.25	21.86	74,580	153	2	81	2	1	6
1918	10.53	12.01	82,144	126	19	47	1	10	102
1919	8.22	12.38	298,760	280	16	48	0	18	90
1920	16.76	19.30	283,064	710	18	4	2	10	26
1921	12.98	17.16	254,835	423	7	76	1	13	25
1922	14.90	20.00	269,184	647	2	81	2	8	9
1923	25.30	27.46	196,481	471	4	3	2	7	108
Mean for 20 years							2	1	23

For the last two seasons we have conducted hay tests with wheat and oats sown separately and in mixture, and in both instances the yield from the mixed crop has been in advance of that obtained from either cereal sown alone. There would not appear to be much difference in this respect between wheat and oats taken separately. In 1922

they were practically on a level, and last year the balance was in favor of the oat crop to the extent of about 9wt. It is not anticipated, however, that this position will be maintained by oats when dry seasons supervene. In all probability the early wheats will then reverse the order, so that over a long period of years it seems likely that the results will reveal very little advantage in favor of either. Granted, however, that the tonnage obtained is approximately equal, the superior feeding value of oaten hay will always stand to its credit, and so important a point should not be overlooked.

TABLE XII.—*Summary of 1923 Hay Returns.*

Field.	Crop.	Area.	Total Yield.			Acre Yield.		
		Acres.	T.	C.	L.	T.	C.	L.
No. 3—Wheat		25.993	57	11	18	2	4	32
Daly's B—Wheat		25.163	68	13	24	2	14	64
No. 5B—Wheat		33.589	64	10	70	1	18	47
		84.745	190	15	0	2	5	2
No. 5B—Oats		37.947	102	19	2	2	14	20
No. 5B—Wheat and oats		5.029	16	15	100	3	6	89
No. 7B—Wheat and oats		17.196	48	8	74	2	16	37
		22.225	65	4	62	2	18	78
Headlands—Various		51.564	112	5	80	2	3	62
Totals		196.481	471	4	32	2	7	108

TABLE XIII.—*Hay Returns from Wheat and Oats Sown Separately and as Mixed Crops, Seasons 1922 and 1923.*

	1922.			1923.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
Wheat	2	11	77	2	5	2	2	8	40
Oats	2	10	103	2	14	29	2	12	66
Wheat and oats	2	18	86	2	18	78	2	18	82

TABLE XIV.—*Showing Hay Returns from Different Wheats, 1920-1923*

Variety.	1920.			1921.			1922.			1923.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
Rajah	—	—	—	2	0	65	3	1	80	2	2	9	2	8	14
Maharajah	—	—	—	2	4	43	2	16	13	2	2	46	2	7	77
Sultan	2	16	75	1	18	107	2	11	24	2	0	22	2	6	85
King's Red	2	2	106	2	9	71	2	8	45	2	4	92	2	6	57
King's White	2	5	23	2	4	22	2	9	2	2	5	66	2	6	8
Felix	2	8	33	2	2	49	2	10	13	2	1	108	2	5	79
Early Crossbred															
53.	3	4	71	2	0	57	2	4	88	1	10	83	2	3	19
President	2	3	19	1	19	89	2	16	4	1	11	96	2	2	86
Caliph	—	—	—	2	1	93	2	10	96	1	14	14	2	2	2
Gresley	—	—	—	—	—	—	—	—	—	1	17	88	—	—	—
Emperor	—	—	—	—	—	—	—	—	—	1	15	84	—	—	—
Leak's Rust	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Proof	—	—	—	—	—	—	—	—	—	1	15	50	—	—	—

It remains to consider the relative merits of the different varieties of wheats and oats brought under trial as hay producers. Twelve wheats were subjected to test last year, and amongst them were a

number that have been under observation since 1920. The heaviest yields this harvest proved to be King's White and King's Red, but when we give consideration to the average returns over three to four seasons we find the first three places held by Rajah, Maharajah, and Sultan respectively. These wheats belong to a series raised at the College by the Experimentalist (Mr. R. C. Scott) from some unfixed crosses made by his predecessor. The credit for the production of these popular varieties belongs properly to Messrs. Scott and Adams, who undertook the task of selecting from a heterogeneous mass of material the desirable types as indicated by comparison with a standard fixed as the result of weeks of patient investigation. They are responsible for the success attained by the production of these wheats, and are deserving of the credit attaching thereto. The varieties in question are derived from King's Early by crossing with beardless varieties in an effort to secure types similar in general character to King's Early but without awns. Felix is another of the same group, which includes also President and Emperor. Further particulars can be obtained by reference to the following table.

The Early Burt oat again heads the list as a hay yielder. The returns given by this variety during the past three seasons were remarkably high and singularly uniform. In 1921, 3 tons 3cwts. 76lbs.; in 1922, 3 tons 2cwts. 36lbs.; and in 1923, 3 tons 34lbs., with a mean yield of 3 tons 2cwts. 11lbs. per acre. Many of the other oats recently introduced by the College have also given excellent yields, notably Mulga, Yarran, Quandong, and Bathurst Early. Referring to the mean figures, which are, after all, the most important, it will be seen that Sunrise ranks next to Early Burt, and Yarran is only a few pounds below it. Kherson, which is worthy of a higher position in the table, did not appreciate the wet conditions, and germinated poorly. Nevertheless, it yields very fine quality hay, and is one of the best storm resisters we have grown.

TABLE XV.—*Showing Hay Returns from Different Varieties of Oats, 1921-1923.*

Variety.	1921.			1922.			1923.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
Early Burt	3	3	76	3	2	36	3	0	34	3	2	11
Sunrise	3	0	30	2	8	67	2	19	5	2	15	109
Yarran	—	—	—	2	10	97	2	19	30	2	15	8
Guyra	—	—	—	2	17	66	2	12	28	2	14	103
Scotch Grey	2	18	9	2	7	42	2	13	66	2	13	2
Bathurst Early	1	14	71	3	2	91	2	17	52	2	11	71
Kherson	3	0	19	2	16	44	1	17	84	2	11	49
Lachlan	2	9	12	2	10	58	2	13	93	2	11	17
Algerian	—	—	—	2	6	0	2	5	3	2	5	58
Mulga	—	—	—	—	—	—	3	0	2	—	—	—
Quandong	—	—	—	—	—	—	2	18	34	—	—	—

(To be continued.)

THE MEDITERRANEAN FRUIT FLY.

(Ceratitis Capitata, Wied.)

[By GEO. QUINN, Horticultural Instructor.]

The recent outbreaks of this pest in the orchards on the Mildura and Curlew Irrigation Areas in Victoria and New South Wales respectively, together with the press agitation thereon and the somewhat heroic steps taken to extirpate the insect in the former district have revived the publicity given to this particular fruit fly about 17 years ago, when it appeared almost simultaneously in orchards situated in many parts of Victoria.

The reappearance of this fruit fly so close to our eastern borders should bring vividly before our fruitgrowers the fact that it stands as a menace on both sides of our State. In the past our immunity has doubtless been largely attributable to our occupying a geographical position whereby a wide expanse of arid, or at least non-fruitgrowing, country stretched between ourselves and our neighbors on both our eastern and western borders, and that their coastal fruit fly infested country was located still further away. These rolling distances certainly formed an effective barrier to natural spread by flight. Again, we are not importers of large volumes of fruit from the fruit fly inhabited areas. These natural and economic factors, combined with a somewhat rigid system of inspection of all fruits and plants at places of entry, have undoubtedly contributed to the immunity our orchards have thus far enjoyed from this much dreaded pest. Writing in the *Journal of Agriculture* for June, 1907, on the subject of the world-wide distribution of this insect, the writer expressed the opinion that "it is only a question of time when this pest must find its way into our midst." This belief, though luckily not yet verified, is still held by me, and the possibilities of its realisation have been vastly increased during the last decade owing to the widespread use of rapid means of transport by motor vehicle opening up almost numberless places of entry along our borders for the bringing in by travellers and excursionists of non-commercial parcels of fruit from east and west.

The two or three days which the overland journey from the Eastern coastal country now occupies rather invites the carrying of fresh fruits for consumption *en route*, and there is nothing more natural than the jettisoning by the wayside of any specimens showing decay or insect attacks.

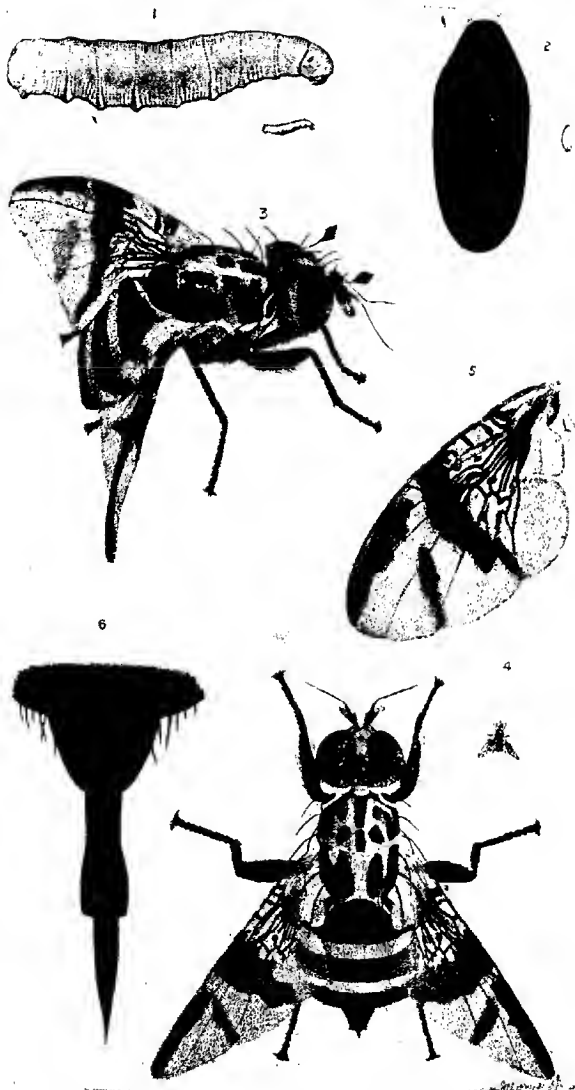
With a view to preventing the transmission of this pest in a living stage from one country or State to another in commercial consignments of fruit many investigations have been made in most parts of the world where it is established.

Being safely buried in the pulp of the fruit by the ovipositor of the parent fly, the eggs and the maggots arising therefrom are immune from the effects of ordinary gases such as are used with safety and success in destroying surface-feeding insects.

Mediterranean Fruit-fly.

(*Ceratitis Capitata*, Wiedmann).

After Mally, in *Agricultural Journal* of Cape Colony.



1. Maggot. 2. Puparium. 3. Male F. 4. Female Fly. 5. Wing.
6. Ovipositor extended. The small figures are life-size.

In consequence of most chemical reagents being inimical to the retention of the flavor or keeping qualities of the fruit, cold storage has been resorted to with very encouraging results. This method has thus far presented to fruit traders the most hopeful way out of the fruit fly difficulty. On this matter Fuller (Natal Entomologist) reported in 1906 that larvae tunnelling in peaches survived confinement in a temperature of 40 deg. Fahr. for 124 days. In 1907 Lounsbury (Cape Town) recorded that all maggots in fruit kept for three weeks in a temperature of 38 deg. to 40 deg. Fahr. perished. In 1907 (Hooper, of Western Australia) reported larvae and eggs as all perishing when kept in 33 deg. to 35 deg. for 15 days. In 1908 Lounsbury again reported the death of all larvae in fruit confined from 21 days to 27 days at 38 deg. to 40 deg. In 1913-14 Back and Pemberton (Hawaii) made extensive tests on larvae and eggs in apples and peaches kept at 32 deg. Fahr. Of 6,747 eggs tested for nine days all perished, and only two out of 2,327 hatched after seven days. After being subjected to this temperature for from 10 days to 15 days, and then removed to a warmer position not one egg hatched out of a batch of 2,221. A further trial showed a complete sterilisation of the eggs held for 21 days to 25 days at 40 deg. to 45 deg. Fahr. Of larvae tested none survived eight days at 32 deg. Fahr., and of 2,558 removed from the cold store after from nine days to 14 days' confinement none survived. From 454 only 11 survived the seventy day of confinement. Tests made at 33 deg. Fahr. had the same effect. These investigators affirm that the younger larvae resist death for a lesser period than the more fully developed specimens, whilst the eggs appear to lose their fertility in a shorter time still. In the *Journal* of the Department of Agriculture of the South African Union for October, 1923, the Chief Entomologist (Mr. Lounsbury) throws out a somewhat disquieting note relative to the absolute effectiveness of cold storage at temperatures used in transporting fruit overseas. He quotes instances of the flies being raised from larvae which had survived the journey to London in a temperature which ranged from 37 deg. Fahr. upwards. Other instances of tests made by Senior Entomologist Mally, who, by the way, is recognised as a world-wide authority on this fruit fly, indicate that larvae survived in paper-wrapped Salwey peaches heavily embedded in wood wool and held in cold storage at Cape Town for six weeks at a temperature varying from 25 deg. to 39 deg. Fahr., but averaging 33.972 deg. Mally says "The total number of larvae taken from the fruits that had been refrigerated four weeks or longer was 82. From them were reared 28 males and 29 female flies. Only one fly was reared from the 14 puparia found in the fifth and sixth weeks." The temperature records of the chamber for the entire six weeks were studied by Mally who reported "readings being noted every two hours with apparently inconsequential exceptions, the range being from 25 deg. to 44 deg. The mean of the readings is 33.972 deg. Over half of the readings are 33 deg., and on only three days is 33 deg. not recorded. On those three days the range is 34 deg. to 39 deg."

It would thus appear that Mally has demonstrated that the larvae of this fruit fly may survive in cold storage at about 34 deg. Fahr.

for considerably longer than the three weeks claimed as fatal by Back and Pemberton.

Mally considers that the larvae found dead in cold stored fruit have been killed by the sudden chilling caused by the transition from a high to a low temperature; also that the apparently uniform successes of earlier years could possibly be attributable to the tests being made with non-wrapped fruits packed in single layers in boxes and with very little wood wool, whilst these latter trials were with fruits wrapped individually and securely embedded in a bulky packing of wood wool as is used in exporting soft fruits.

Mr. Lounsbury concludes this report with the remark "It follows there is still hope that refrigeration may be made thoroughly effective, and also that it is ordinarily effective."

During the past year, when the importation of apples from Western Australia was undertaken by merchants, this Department insisted on the fruit bringing an official certificate to the effect that it had already been in cold storage for not less than two months. Failing this it was bonded in a cold store for that period.

Any fruitgrower, desirous of studying the habits of this pest and methods of prevention found most useful in infested countries, may secure a bulletin from this office dealing with these matters in detail.

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KYBYBOLITE EXPERIMENTAL FARM.

HARVEST REPORT, 1923-24.

[By L. J. Cook, Manager.]

This farm is situated in the hundred of Binnun, in the south-east of the State, and contains about 1,000 acres of land, immediately surrounding the old Kyhybolite sheep station. The land is slightly undulating, and varies considerably in texture, color, and composition. The great bulk of the soils consists of comparatively heavy and cementy loams, containing a large proportion of ironstone rubble over stiff clays of varying depths, and much lacking in the element lime, whilst there is a fair amount of heavy working "crabhole" land.

THE SEASON, 1923.

The season has been a very poor one, especially for autumn and winter sown cereals; conditions were more suitable for spring and summer crops, and these generally have yielded above the average. A perusal of the rainfall table shows that January, February, March, and April constituted the driest period on record at the farm, and during that period no land could be prepared for seeding. The dry period broke early in May, and then rain fell almost continuously throughout the winter, so that during the months of May, June, and July the rainfall was considerably above the average for these months. During August average conditions prevailed, but during September heavy rains fell, and these further hindered the growth of the winter cereals, which had somewhat recovered from the effects of winter saturations. Good average conditions prevailed during the last three months, and summer crops benefited. A very fair growth of natural feed was maintained throughout the year on the pastures, of which a larger area was available on account of such small areas being under crop. Sufficient feed was available in the fields, and very little hand-feeding of stock was necessary. Clovers germinated particularly well on the pastures, and maintained really good growth on those fields that have now received a comparatively large number of dressings of phosphatic fertiliser.

The following table sets out in detail the rainfall at the farm since 1906:—

Rainfall Distribution at Kybybolite, 1906-1923.

	Means, 1906- 1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1906- 1923.
January . . .	0.37	1.29	0.45	0.29	0.16	0.08	1.07	0.40	0.39	0.44
February . . .	0.93	0.28	2.81	0.23	2.35	0.07	0.88	0.17	0.31	0.91
March . . .	1.53	0.03	1.17	0.27	0.84	0.98	0.63	0.20	0.01	1.08
April . . .	1.50	2.07	0.74	1.38	0.06	0.38	0.62	1.30	0.00	1.20
May . . .	2.52	0.69	4.72	2.48	2.09	2.85	1.72	2.18	4.66	2.59
June . . .	3.14	3.56	1.33	3.52	1.53	4.31	2.16	2.68	5.03	3.08
July . . .	3.13	2.68	4.47	2.42	2.21	3.04	3.03	2.50	3.78	3.08
August . . .	2.67	2.94	2.69	2.76	1.08	4.29	3.55	2.83	2.51	2.74
September . . .	2.96	2.77	2.96	0.53	2.53	2.44	2.97	2.58	4.07	2.80
October . . .	1.80	2.20	2.78	2.70	1.64	0.98	1.24	2.72	2.09	1.91
November . . .	1.55	3.28	2.21	0.65	0.29	0.91	3.24	0.32	1.08	1.53
December . . .	1.21	1.74	0.36	1.09	0.82	0.54	1.38	2.81	1.74	1.25
Total rainfall . . .	23.31	23.53	26.69	18.32	15.60	20.87	22.49	20.69	25.67	22.61
Total "useful" rain Apr.-Nov. . .	19.27	20.19	21.90	16.44	11.43	19.20	18.53	17.11	23.22	18.93

In what we know as our "cereal" districts the yield of cereal crops can usually be estimated fairly reliably on the amount of rain which falls between April and November. Even in such districts the yield is to a large extent dependent on the distribution of that rainfall over the period; but in the peculiar soil conditions of this farm, where the average annual rainfall is comparatively good, the success of these crops depends almost wholly on the distribution of this "useful" rain. In the next table the distribution of the April to November rainfall is set out. It shows excessive seeding, winter, and spring rains, whilst the early summer rain was a little below average. The total of 23.22in. of "useful" rain out of a total fall of 25.67in. for the year is the highest amount recorded at the farm since 1909—1½in. more than 1917, the next highest records of "useful" rain. Years of heavy rainfall between April and November have invariably been poor years for cereal crops.

Distribution of "Useful" Rain, Kybybolite, 1923.

	1923. In.	Means, 1906-1923. In.
Seeding rains (April to May)	4.66	3.79
Winter rains (June-July)	8.81	6.16
Spring rains (August-October)	8.67	7.45
Early summer rains (November)	1.08	1.53
Total "useful" rain	23.22	18.93

CROPS.

Our practice of late has been to grow cereals for forage, hay, &c., grain to be fed mainly to stock on the farm, together with other crops (principally leguminous and cruciferous) in rotation tests and cereals.

On account of the late opening of the season, the area under crops was greatly curtailed, but every effort was made to get as much sown as possible, and we were able to sow all crops, with only one exception, in the permanent rotation tests.

Green Forage Crops.—It has been usual of late years to sow large areas of stubble land early in the season with a mixture of cereals, to provide stock feed during the winter months, at which time natural pastures are usually very poor. This year this class of cropping naturally had to be abandoned. However, Field No. 14 was sown as a hay crop, but in the spring the weeds and clovers had over-run the cereals, and the crop was then treated as a forage crop, and fed off by the milking herd. The field was fallowed early in October 1922, was cultivated in November, February, and again in March. It was sown dry late in April with 60lbs. Queen Fan wheat, and 40lbs. Algerian oats per acre, with 1 cwt. super. The crop gave good feed throughout October, November, and part of December, carrying the equivalent of 1.35 sheep per acre per year.

Crimson Clover.—Field No. 6A, in a six-course rotation, came in for a grazing crop, and crimson clover was again utilised, sown on often hay stubble. The field was skim-ploughed on May 9th and 10th, immediately after the first rains, and 10lbs. clover seed per acre was at once broadcasted over the field. Good rains following firming the seed in the soil, and a good germination resulted. The field produced good spring feed, and was used by the dairy herd during October, November, and December. It carried the equivalent of 4½ sheep per acre for the three months.

Lucerne.—The field of this crop, No. 10, which was sown in 1915, and has never been irrigated, again made very useful growth during the late spring and summer months. On account of the late rains and cold spring weather, the first cut was late and rather weak. During the middle of November 8 tons 15cwts. were cut from an area of 2.96 acres, equalling 2 tons 19cwts. and 14lbs. per acre. This was put into the silo. The field was then dressed with 1 cwt. super per acre, and a second cut of 30cwts. was secured on December 17th, 22nd, and fed to the dairy herd. The field was grazed at odd times during the year by the dairy herd, and carried the equivalent of 1.5 sheep per acre, in addition to the two cuts that were carted off the land.

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Paspalum.—The plants of this grass in Field No. 9 have continued to make fair growth during the summer months. The field has carried the equivalent of 1.26 sheep per acre for the year. The average carrying capacity of the field for the past three seasons has been 1.30 sheep per acre.

Wimmera Rye Grass.—On account of the short seeding period we were unable to sow a field of this grass. However it germinated well from self-sown in various fields, and is spreading over the farm.

Subterranean Clover.—An area of 30 acres of this clover was established during the year in fields Nos. 20c and 11A. Early in the year it was decided to change the rotation of fields Nos. 20A to 20c from peas, wheat, kale, kale, and oats, to wheat, oats, and three years subterranean clover. Consequently Field No. 20c, which carried a wheat crop in 1922, was sown to oats immediately after the break-up of the weather in May, with a dressing of 2cwt. 36 per cent. super per acre, and 4lbs. subterranean clover seed per acre was broadcasted behind the drill. Half of the field was harrowed after the seed was broadcasted, and the other half was harrowed before the seed was sown. Rain fell immediately, and a good germination was secured all over the field. The clover grew well, spread in amongst the oat plants, and practically covered all the field, except those parts that were under water for at least two months of the year. The clover seeded well, and it is anticipated that besides giving good stubble feed, there will be ample seed to make a real good stand of pasture during 1924. Field No. 11A (about $1\frac{1}{2}$ acres) was also seeded with 3lbs. clover and with 50lbs. barley. These came away well with self-sown Wimmera rye grass, and the field was used for grazing calves during the spring and summer.

Alsike Clover.—On account of the promising results secured from this clover in small trials, it was this year sown with Italian rye grass in the two-year grazing plot, Field No. 9f in a six-course rotation. The field was ploughed shallow on May 18th, and immediately harrowed down. Ten pounds Italian rye grass and 2lbs. Alsike clover were broadcasted per acre, and rolled in. A really good germination of both plants resulted. They grew well amongst the self-sown barley in the field. The clover made quite a good stand, and continued growing well into January. The plot was grazed by milk cows, and later by sheep, and carried for the year the equivalent of 2.14 sheep per acre.

Bokhara or Sweet Clover.—This clover was tried, spring sown, in No. 8b. The field was ploughed to a depth of 6in. early in September, and harrowed, cultivated and rolled to a suitable tilth during the following six weeks. On October 31st one acre of the field was

sown with the clover in rows 28in. apart, 5lbs. seed, and 50lbs. super being used. A very fair germination resulted, and as soon as the rows were sufficiently visible the cultivator was put between them. However, a thick growth of summer weeds, such as fat hen, night-shade, and wireweed came away in the rows of clover, and the latter made only a fair showing against the weeds.

Annual Summer Fodders (without irrigation).—On account of the poor prospects of the ordinary autumn-sown cereals producing sufficient ensilage and hay for the use of the farm, comparatively large areas were prepared and sown to summer crops. Field No. 16 was ploughed 4in. deep early in September, immediately harrowed and cultivated, and on September 11th was drilled with the following crops in rows 28in. apart, and all with 50lbs. super per acre:—4 acres maize (Silvermine variety) at the rate of 30lbs. seed per acre; 3 acres Black Amber Sorgo at the rate of 10lbs. seed per acre; 4 acres sunflowers at the rate of 6lbs. seed per acre.

The field was harrowed after it was drilled. The germination, except in the case of a few sunflowers, was a failure owing to the heavy cold rains which fell immediately after seeding. The field was cultivated on October 19th, and the three plots resown on October 23rd, as before, excepting for the maize variety, Improved Yellow Dent being sown this time. A good germination of maize and sunflowers followed the second sowing; the sorghum germinated slowly and irregularly.

A portion of Field No. 15 that had been ploughed for oats early in June, but which we were unable to drill, was again ploughed early in September, and immediately cultivated and harrowed down. It was again cultivated in October, and on the 24th of that month drilled with the following crops in rows 25in. apart, and all with 50lbs. super per acre:—7 acres sunflowers, at the rate of 6lbs. seed per acre; 1 acre Sudan grass, at the rate of 8lbs. seed per acre; 7 acres maize (Early Leaming), at the rate of 30lbs. seed per acre.

The field was harrowed after it was sown. A good germination resulted, and immediately the rows were quite visible both fields were cultivated between the rows; and they were cultivated periodically throughout the summer months to check weed growth and prevent undue loss by evaporation. The crops made good growth, especially the sunflowers, which were not affected by the changeable weather conditions as much as others. The crops produced green feed for the dairy herd during January and February, and the bulk of them were chaffed into the silo during the latter month. The sunflowers

yielded 3 tons 7cwts. 72lbs. green feed per acre, the maize 1 ton 10cwts. 109lbs., and Sudan grass (first cut) 7cwts. 5lbs. The sorghum was grazed in the field.

The following table shows the yields of these crops during the last two seasons:—

*Yields of Summer Crops, Kybybolite, 1922 and 1923
(without irrigation).*

Year.	Winter rains (Apr.-Sep.)	Late spring & summer rains (Oct-Jan.).	Sunflowers.			Maize.			Sudan grass.			Means.		
	Ins.	Ins.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1922	14.07	6.24	1	17	0	2	11	0	12	0		1	13	37
1923	20.05	5.83	3	7	72	1	10	109	7	5		1	15	25
Average	17.06	6.03	2	12	36	2	0	110	9	58		1	14	31

Turnips.—Fields Nos. 9E (2 acres), 4C (4 acres), and 6F (10 acres) were sown to turnips during 1922. A fair growth resulted. Field 4C, on account of weed growth, was fed to lambs in the autumn of 1923, whilst the other two fields were reserved, and fed to sheep during the winter. They gave splendid feed for the ewes during June and July, when natural feed was scarce. The actual carrying capacity of the crops was not as high as was the case during the previous year, but that was due mainly to the long dry spell of the late summer and autumn. The crops actually carried in Field No. 9E the equivalent of 3.20 sheep. Field 4C 2.63, and Field 6F 1.58 sheep per acre per year.

Turnips were again sown in the spring of 1923 in the same three rotation in Fields Nos. 9D, 4B, and 6E. The plots were ploughed deeply in late August and early September, and harrowed and cultivated during the spring, whenever the soil was in suitable condition, to check weed growth. The seed was drilled on a rolled surface from October 31st to November 2nd in rows 28in. apart. The Mammoth variety was used, and 4lbs. per acre was sown in 9D, the other two fields receiving 2lbs. Each plot was dressed with 50lbs. super 36 per cent. per acre. The seed was drilled very shallow, and covered by rolling. A good germination resulted in all fields, and cultivations were given as soon as the rows of plants were visible, and periodically during the summer months. The crops made good quick growth, and the late summer rains should ensure a large number of good sized turnips for next winter's feeding.

Kale.—Sown in Field No. 20B in 1922, failed during the winter. The dry autumn killed out a number of the plants, and the extreme wet following immediately soon destroyed the balance of them. On

account of the difficulty in satisfactorily handling kale in these 30-acre fields, this five-course rotation has now been altered to wheat, oats, and three years subterranean clover. Two acres of kale (Thousand Headed) was sown in Field No. 8b towards the end of October, but a poor germination resulted, and grubs thinned out the young plants early in their growth.

Silver Beet.—Field No. 10a was ploughed deeply during early September, and cultivated, harrowed, and rolled to a suitable tilth during October. On November 2nd, half-an-acre was sown with silver beet in rows 28in. apart, 4lbs. soaked seed and 50lbs. super per acre being used. Seed was drilled shallow, and covered by rolling. A good germination was secured, and cultivations were given during the summer. Some very useful green feed has been available during January and February.

Chou Moellier.—An area of $1\frac{1}{2}$ acres of this crop was grown in Field 10a, the land being prepared as described for silver beet. 2lbs. seed and 50 lbs. super were given per acre. The crop is being grazed, and so far has given quite a considerable amount of feed during the summer.

ENSILAGE CROPS.

Field No. 3a, during 1922, carried a green feed crop of barley, which was grazed during the winter and spring. The field was ploughed on May 15th, and immediately sown with a mixture of 60lbs. White Essex wheat, and 40lbs. Algerian oats, and 1cwt. super per acre. This field contains a fair amount of organic matter, and the crop withstood the wet well. During September and October, 48cwt. of green feed were cut and fed from the field—the balance of the crop was used for ensilage making.

Field No. 3b carried a green feed crop of oats during 1922, was ploughed on May 14th this year, and immediately sown similarly to Field 3a. The crop made good growth in patches.

Field No. 9c produced 21 bushels of wheat per acre during 1922. The stubble was burnt in March, and the field skim-ploughed on May 15th. On May 17th it was sown with 60lbs. Algerian oats and 20lbs. Black Vetches per acre, with 1cwt. super. The crop germinated well, and made very fair growth; the vetches made a better growth in comparison than the oats.

Portion of Field 9b was sown in error to oats and vetches, and this was also cut and made into ensilage.

As mentioned under "Lucerne," Field No. 10 was mowed of its first growth of lucerne and grass, and put into the silo.

Also maize and sunflowers from Fields Nos. 15 and 16 were cut and chaffed into the silo during February. Particulars of these crops have been given under the heading of "Annual Summer Crops."

The following table shows the returns of ensilage secured from the various fields:—

Ensilage Yields, Kybybolite, 1923.

Field.	Area. Acres.	Variety of Crop.	Total Yield.			Yield per Acre.		
			T.	C.	L.	T.	C.	L.
No. 3A . . .	2.39	Wheat and oats mixed	12	2	56	5	1	52
No. 3B . . .	5.80	Wheat and oats mixed	21	15	28	3	15	5
No. 15 . . .	5.23	Sunflowers	17	13	84	3	7	72
No. 9C . . .	1.94	Oats and vetches	5	16	0	2	19	86
No. 10 . . .	2.96	Lucerne	8	15	0	2	19	14
No. 9B . . .	1.00	Oats and vetches	2	13	14	2	13	14
No. 15 . . .	4.77	Maize	7	7	84	1	16	109
No. 16 . . .	6.47	Maize and sunflowers	7	17	84	1	4	42
No. 15 . . .	1.10	Sudan Grass	0	7	84	0	7	5
Average . .	31.66		84	8	98	2	13	39

The average return of less than 3 tons per acre is poor, and the following table shows it in comparison with the previous three years, during which the silo has been in use:—

Ensilage Returns, Kybybolite, 1920-23.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield.			Yield per Acre.		
				T.	C.	L.	T.	C.	L.
1920	20.87	19.20	25.27	44	10	84	1	15	28
1921	22.49	18.53	19.01	85	8	70	4	9	99
1922	20.69	17.11	11.95	61	8	101	5	2	94
1923	25.67	23.22	31.66	84	8	98	2	13	39
Average .	22.43	19.51	—	—	—	—	3	10	37

HAY CROPS.

Hay growing is important on a livestock farm such as this, and every endeavor was put forward to produce sufficient hay for our own requirements. We were able to carry over about 40 tons from our previous harvest, and therefore needed to cut at least 80 tons this season. To do this we had to cut a number of crops that were really sown for grain production.

As usual, three types were grown, namely, wheat and oats separately, and mixed together.

Mixed Hay.—Field 16A was fallowed late in October, 1922, cultivated in February, and again in March. During April a dressing of 1 ton agricultural lime per acre was applied. On May 15th the field was skim-ploughed, and sown with 60lbs. White Essex wheat and 40lbs. Algerian oats, and 1cwt. super per acre. This field has very

poor under-drainage, and consequently the soil was practically saturated for several months of the winter. The crop recovered a little in the spring, and we secured 11cwt. 45lbs. hay per acre.

Field No. 14 was also sown with mixture for hay, but as the crop was doing very poorly, it was grazed in the spring. Particulars have been given under the heading "Green Forage Crops."

Oaten Hay.—Only one field, No. 6b, was sown exclusively for oaten hay, but Field 4b and portion of 15 necessarily had to be cut to secure sufficient hay.

Field 4c, in 1922, carried a turnip crop, which was grazed during February of 1923. On May 9th the field was skim-ploughed, and sown with 60lbs. Algerian oats and 1cwt. super per acre. This field easily produced the most and best growth of cereal on the farm for the season.

Field No. 6b carried a grazing crop of crimson clover during 1922. It was ploughed on May 11th and 12th, and sown with 60lbs. Algerian oats and 1cwt. super per acre. This field has poor under-drainage, and the crop did poorly all the season.

Field No. 15 was grazed during 1922, was ploughed during the latter end of May, and drilled as weather would permit during June. As portions of the field possess fair under-drainage, some growth of hay was received.

The following table shows the yields of oaten hay for the season:

Oaten Hay Yields, Kybybolite, 1923.

Crop.	Field Grown.	Area Acres.	Total Yield.			Yield per Acre.		
			T.	C.	L.	T.	C.	L.
Algerian	No. 4c	4.05	9	15	56	2	8	30
Mixed varieties . . .	No. 15	11.05	7	9	56	0	43	59
Algerian	No. 6b	9.57	5	1	28	0	10	65
Average		24.67	22	6	28	0	18	10

Whaten Hay.—Field No. 6b carried a pea crop yielding 19½ bushels per acre in 1922. It was ploughed on May 16th and 17th, and sown immediately with 60lbs. White Essex wheat, and 1cwt. super per acre. This germinated well, and considering the season, the crop made very nice growth, and yielded very well.

Field No. 4a also carried peas in 1922, but these were grazed. The field was ploughed on May 15th and 16th, and immediately drilled with 60lbs. Leak's Rust-Proof wheat, and 1cwt. super per acre. Portion of this field became waterlogged, but the balance carried a very heavy crop.

Field No. 20b was fallowed in September, 1922, limed with 1 ton agricultural lime per acre, and cultivated twice during summer and

autumn. It was skim-ploughed towards the end of May, and sown under rather wet conditions with three varieties of wheat—White Essex, Leak's Rust-Proof, and Queen Fan—at the rate of 70lbs. seed and 1cwt. super per acre. The field suffered very much from the wet, but on the ridges, and better drained portions, the crop made quite nice growth.

The phosphate rock tests with wheaten hay were this year in Field No. 16B. They were sown in real good conditions of soil in the middle of May, at the rate of 80lbs. White Essex seed per acre. This field consists of very poor soil, and was waterlogged for several months. Much of the wheat made little or no recovery in the spring.

Some wheat plots were also cut from No. 15 to help secure the hay quota. The following table shows the wheaten hay yields for the season:—

Wheaten Hay Yields, Kybybolite, 1923.

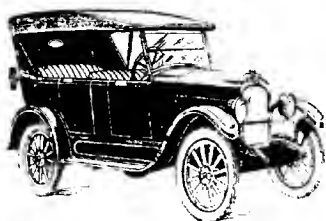
Crop.	Field Grown.	Area Acres.	Total Yield.			Yield per Acre.		
			T.	C.	L.	T.	C.	L.
White Essex . . .	No. 6D	9.14	14	5	0	1	11	20
Leak's Rust Proof .	No. 4A	5.28	6	16	56	1	5	96
Mixed Varieties . .	No. 20D	29.50	23	18	0	0	16	20
Mixed Varieties . .	No. 15	17.66	8	13	0	0	9	89
White Essex . . .	No. 16B	10.00	3	10	84	0	7	8
Average		71.58	57	3	28	0	15	109

The next two tables set out the total hay cut, and the yield per acre in the one case, and in the other the averages secured for the different types, for the period 1918-1923:—

Hay Yields, Kybybolite, 1923.

Kind.	Area. Acres.	Total Yield.			Yield per Acre.		
		T.	C.	L.	T.	C.	L.
Oaten	24.67	22	6	28	0	18	10
Wheaten	71.58	57	3	28	0	15	109
Mixed	6.15	3	10	14	0	11	45
Farm average	102.40	82	19	70	0	16	23

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Cereal Hay Crops, Kybybolite, 1918-1923.

	Oaten.			Yield per Acre. Mixed.			Wheaten.			Farm Average.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1918	1	4	97	0	16	106	1	5	30	1	2	58
1919	1	11	26	1	14	52	1	1	89	1	8	45
1920	0	17	92	0	17	4*	0	12	70	0	7	4
1921	1	6	0	1	17	25	1	5	67	1	12	43
1922	1	10	102	1	12	45	1	17	31	1	13	51
1923	0	18	10	0	11	45	0	15	109	0	16	29
Means	1	4	92	1	4	102	1	3	10	1	5	0

* As no mixture of hay was grown during 1920, the average hay yield for the season has been allowed for that year.

The following table shows the returns of hay for the farm since 1910:—

Hay Returns, Kybybolite, 1910-1923.

Year.	Total Rainfall.	"Useful" Rainfall.	Area. Acres.	Total Yield.			Yield per Acre.		
	In.	In.		T.	C.	L.	T.	C.	L.
1910	28.35	21.08	106.13	88	19	28	0	16	85
1911	22.23	14.72	94.04	136	6	110	1	9	28
1912	20.83	18.23	26.29	67	7	70	2	10	76
1913	18.44	13.93	108.55	166	11	0	1	10	77
1914	11.94	8.43	109.00	90	1	0	0	16	59
1915	23.30	21.18	108.66	111	14	56	1	0	65
1916	23.53	20.19	77.35	135	1	0	1	14	102
1917	26.69	21.90	96.77	49	9	0	0	10	25
1918	18.32	16.44	152.85	172	1	70	1	2	38
1919	15.60	11.43	148.81	211	7	14	1	8	45
1920	20.87	19.20	66.05	56	5	28	0	17	4
1921	22.49	18.53	118.57	192	0	14	1	12	43
1922	20.69	17.11	85.88	143	13	14	1	13	51
1923	23.67	23.22	102.40	82	19	70	0	16	29
Means	21.35	17.54	—	—	—	—	1	5	77

OAT CROPS.

Field No. 15, as previously stated, was ploughed late in May, and between May 31st and June 2nd a collection of oat varieties was sown under good soil conditions in the north-west corner of the field, at the rate of 60lbs. seed and 1cwt. super per acre. These were left and harvested for grain. A few other varieties were grown on other portions of the field, but as they did not receive such suitable seeding conditions, they were cut out for hay.

Field No. 20c carried a 21-bushel wheat crop in 1922. The stubble was burnt in March, and the field skimmed over immediately after the rains in May. On May 9th to 11th it was sown with 60lbs. Algerian oats and 2cwts. super per acre, and 4lbs. Subterranean Clover seed was broadcasted behind the drill. The crop started really well, but as the field is one of the wettest on the farm, the oats suffered very much by the long continued rains, and the subsequent yield was very disappointing.

The following table includes a list of varieties harvested, and their yields:—

Out Variety Yields, Kyhybolitc, 1923.

Variety.	Field Grown.	Area, Acres.	Total Yield.		Yield per Acre.	
			B.	L.	B.	L.
Algerian	No. 15	2.15	36	21	16	39
Newmarket White	No. 15	0.085	1	17	16	31
Ruakura	No. 15	0.65	10	18	16	23
Yarran	No. 15	0.38	5	31	15	8
Scottish Chieftain	No. 15	0.064	0	38	11	31
Gayra	No. 15	0.38	5	16	11	8
Mulga	No. 15	0.38	5	10	13	33
White Horse	No. 15	0.064	0	34	13	11
Quandong	No. 15	0.38	1	31	12	31
Bathurst Early	No. 15	0.38	1	22	11	39
Clydesdale	No. 15	0.38	1	20	11	34
Glen Innes No. 1	No. 15	0.053	0	24	11	13
Algerian Tartar	No. 15	0.38	4	6	10	37
Stable King	No. 15	0.053	0	23	10	34
Ascot White	No. 15	0.053	0	21	9	36
Sunrise	No. 15	0.19	1	35	9	35
Lachlan	No. 15	0.128	1	8	9	15
Very Early Black Hybrid . .	No. 15	0.096	0	34	8	34
Fulgham	No. 15	0.064	0	19	7	17
Goldfinder	No. 15	0.61	4	19	7	13
Wilga	No. 15	0.064	0	22	8	24
Algerian	No. 20c	28.34	132	26	4	27
Champion Black Tartarian . .	No. 15	0.032	0	4	5	5
Total		35.34	228	22	-	-
Farm average		—	—	—	6	13

The following table sets out the returns received from oats since 1910:—

Oat Returns, Kyhybolitc, 1910-1923.

Year.	Total "Useful"		Area, Acres.	Total Yield.		Yield per Acre.	
	Rainfall. In.	Rainfall. In.		B.	L.	B.	L.
1910	28.35	21.08	77.00	1,001	0	13	0
1911	22.23	14.72	60.91	828	13	13	24
1912	20.83	18.23	103.00	3,450	36	33	20
1913	18.44	13.93	94.55	1,460	10	15	18
1914	11.94	8.43	6.00	61	3	10	7
1915	23.30	21.18	79.74	1,251	25	15	28
1916	23.53	20.19	61.94	1,388	39	22	17
1917	26.69	21.90	20.66	151	13	7	19
1918	18.32	16.44	36.93	554	25	15	1
1919	15.60	11.43	50.77	1,144	34	22	22
1920	20.87	19.20	36.29	613	1	16	36
1921	22.49	18.53	52.82	708	39	13	17
1922	20.69	17.11	86.40	1,611	31	18	26
1923	25.67	23.22	35.34	228	22	6	19
Means	21.35	17.54	—	—	—	16	1

BARLEY CROPS.

Only two fields were sown to barley, and both of these to the one variety—Shorthead. Field No. 9E carried a turnip crop in 1922. This was grazed by sheep during May and June, 1923, and pigs cleared up the last of the turnip roots during July, when they rooted the whole of the soil over very well. On August 27th the field was cultivated, and immediately drilled with 60lbs. seed and 1cwt. super per acre, and harrowed. The crop germinated well, grew to quite a nice height, and headed very well.

Field No. 6E also carried a turnip crop, which was grazed by sheep during July, 1923. From August 27th to 29th the field was ploughed, harrowed, and sown with 70lbs. barley and 1cwt. super per acre, and harrowed. This crop germinated well, but made comparatively short growth, and had a number of very poor patches in it.

The following table shows the yields received from the two fields:—

Barley Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield.		Yield per acre.	
			B.	L.	B.	L.
Shorthead	No. 9E	1.94	47	15	24	19
Shorthead	No. 6E	10.81	126	7	11	33
Total		12.75	173	22	—	—
Farm average		—	—	—	13	30

The average yield of nearly 14 bushels per acre is satisfactory considering the poor weather conditions of the season.

The following table shows the barley returns received since 1910:—

Barley Returns, Kybybolite, 1910-1923.

Year.	Total Rainfall.	“Useful” Rainfall.	Area. Acres.	Total Yield.		Yield per Acre.	
	In.	In.		B.	L.	B.	L.
1910	28.35	21.08	45.39	299	29	6	30
1911	22.23	14.72	58.76	552	16	9	20
1912	20.83	18.23	50.00	1,500	0	30	0
1913	18.44	13.93	35.00	527	0	15	3
1914	11.94	8.43	3.02	37	48	12	29
1915	23.30	21.18	50.28	789	39	15	35
1916	23.53	20.19	43.24	273	37	6	17
1917	26.69	21.90	66.31	304	41	4	30
1918	18.32	16.44	35.08	266	48	7	31
1919	15.60	11.43	39.71	655	1	16	25
1920	20.87	19.20	55.77	474	7	8	25
1921	22.49	18.53	54.56	339	22	6	11
1922	20.69	17.11	10.78	196	42	18	13
1923	25.67	23.22	12.75	173	22	13	30
Means	21.35	17.54	—	—	—	12	11

RYE CROP.

A few acres of rye were sown in Field No. 15 during July, but germination was poor, and only a few odd patches were worth harvesting. From 2.90 acres 3 bushels 9lbs. seed were gathered.

The following table shows all yields of rye grown at this farm since 1914. In compiling these figures, rye has been taken as weighing 60lbs. per bushel:—

Rye Returns, Kybybolite, 1914-1923.

Year.	Total Rainfall. In.	“Useful” Rainfall. In.	Area. Acres.	Total Yield.		Yield per Acre.	
				B.	L.	B.	L.
1914	11.94	8.43	6.00	90	16	15	3
1915	23.20	21.18	7.27	48	14	6	38
1916	23.53	20.19	8.20	35	3	4	16
1917	26.69	21.90	—	Failure.			
1918	13.32	16.44	4.62	52	0	11	15
1919	15.60	11.43	7.23	37	7	5	8
1920	20.87	19.20	14.71	47	48	3	15
1921	22.49	18.53	10.44	74	44	7	9
1922	20.69	17.11	4.09	24	50	6	4
1923	25.67	23.22	2.90	3	9	1	5
Means . . .	20.90	17.76	—	—	—	5	59

WHEAT CROPS.

Field No. 9B, in a six-course rotation, had been grazed for two years, was fallowed on October 2nd, 1922, cultivated, and limed with 1 ton per acre in the spring, and harrowed and cultivated twice during the summer and autumn. It was skim-ploughed on May 15th, and drilled with 65lbs. Federation wheat and 1cwt. super per acre. The crop made only fair growth. Also two plots of wheat sown on May 26th in Field No. 15 were left and harvested for grain for seed for the next season.

The following table shows the wheat yields received:—

Wheat Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield.		Yield per acre.	
			B.	L.	B.	L.
Federation . .	No. 9B	0.94	8	47	9	21
Crossbred 53 Early	No. 15	2.96	11	5	3	45
White Tuscan .	No. 15	3.82	12	51	3	22
Total		7.72	32	43	—	—
Farm average		—	—	—	4	14

The following table shows the wheat returns since 1910:-

Wheat Returns, Kybybolite. 1910-1923.

Year.	Total Rainfall.	"Useful" Rainfall.	Area. Acres.	Total Yield.		Yield Per Acre.
	In.	In.		B.	L.	
1910	28.35	21.08	15.00	79	43	5 19
1911	22.23	14.72	17.15	232	45	13 32
1912	20.83	13.23	81.91	1,876	35	22 72
1913	18.44	13.93	48.20	1,288	56	26 41
1914	11.94	8.43	22.17	238	32	10 46
1915	23.30	21.18	79.64	882	31	11 -
1916	23.53	20.19	98.75	1,875	19	18 59
1917	26.69	21.90	70.46	231	29	3 17
1918	18.32	16.44	58.52	1,027	40	17 11
1919	15.60	11.43	78.26	1,190	50	15 11
1920	20.87	19.20	73.37	812	8	11 4
1921	22.49	18.53	125.24	1,548	54	12 22
1922	20.69	17.11	61.73	872	38	14 8
1923	25.67	23.22	7.72	32	43	4 14
Means . . .	21.35	17.54	—	—	—	13 22

PEA CROPS.

Peas were grown in two fields in various rotations. Field No. 4b carried a 30-bushel oat crop in 1922, was ploughed on August 1st, and immediately limed with 1 ton agricultural lime per acre. On August 7th it was harrowed, and sown with 120lbs. Early Dun peas and 1cwt. super per acre, and harrowed again. The peas germinated well, and made good quick growth, returning the satisfactory yield of 22bush. per acre.

Field No. 6c carried an 18bush. barley crop in 1922, was ploughed in June, and limed during July with 30cwt. agricultural lime per acre. The field was cultivated on August 28th, and drilled with 120lbs. Early Dun peas and 1cwt. super per acre, and harrowed. This crop germinated well, but had made only a little growth when the heavy rains of September fell. These checked the peas, and they did not recover well. The bulk of the field has poor under-drainage.

Field No. 16c should also have been sown to peas, according to rotation, but on account of wet condition of the field it was impossible to work teams on the land until late in September, and it was then decidedly too late to sow peas, and the field was treated as bare fallow instead.

The following table shows the yields of peas received:—

Pea Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield.		Yield per Acre.	
			B.	L.	B.	L.
Early Dun	No. 4D	4.11	90	11	21	57
Early Dun	No. 6C	8.84	54	34	6	10
Total		12.95	144	45	—	—
Farm average		—	—	—	11	11

The general returns of peas for the season are fairly satisfactory.

They have a decidedly good effect on the cereal crop following them, and as a crop are worth further perseverance in the district:

Field Pea Returns, Kybybolite, 1916-1923.

Year.	Total Rainfall.	"Useful" Rainfall.	Area. Acres.	Total Yield.		Yield per Acre.	
	In.	In.		B.	L.	B.	L.
1916	23.53	20.19	32.64	498	34	14	49
1917	26.69	21.90	Failure.	Failure.	Failure.	Failure.	Failure.
1918	18.32	16.44	27.54	21	20	0	46
1919	15.60	11.43	42.68	80	41	1	53
1920	20.87	19.20	4.05	6	11	1	32
1921	22.49	18.53	24.22	189	55	7	50
1922	20.69	17.11	18.77	261	57	13	57
1923	25.67	23.22	12.95	114	45	11	11
Means . . .	21.73	18.50	—	—	—	6	30

The following table summarises generally the returns of the chief crops harvested for 1923, showing the average yield per acre, their values at current rates, and also as stock food, compared with hay at £3 per ton, based on tables prepared by the Director of Agriculture Professor Arthur J. Perkins):—

Value of Crops Harvested, Kybybolite, 1923.

Type of Crop.	Yield. per Acre.			Current Market Prices per ton.	Value at Current Market Rates.	Value as Stock Food per ton.	Value as Stock Food per Acre.		
	T.	C.	L.				£	s.	d.
Ensilage	2	13	39	20 0	2 13 4	19 5	2	11	9
Hay	0	16	23	80 0	3 4 10	60 0	2	8	7
	B. L.			per bush.		per bush.			
Peas (grain) . .	11	11					2	0	1
Barley	13	30		3 0	2 0 10	2 7	1	15	2
Oats	6	19		3 0	0 19 5	2 1	0	13	6
Wheat	4	14		4 0	0 16 11	3 10	0	16	3
Rye	1	5		4 0	0 4 4	3 9	0	4	1

The following table shows the average annual value per acre of crops harvested at the farm during the last three seasons:—

Value of Crops Harvested, Kybyholite, 1921-1923.

Year.	Ensilage.	Hay.	Wheat.	Peas.	Oats.	Barley.	Rye.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
At current rates—							
1921 . .	3 7 5	4 17 2	3 1 10	2 18 9	1 13 7	0 18 8	1 1 1
1922 . .	3 17 2	5 0 4	3 10 8	5 4 7	2 6 8	2 14 9	0 12 1
1923 . .	2 13 4	3 4 10	0 16 11	3 18 3	0 19 5	2 0 10	0 4 3
Means	3 6 0	4 7 5	2 9 10	4 0 6	1 13 3	1 18 1	0 11 1
As stock food—							
1921 . .	4 7 3	4 17 2	2 7 5	1 8 1	1 8 0	0 16 1	1 1 1
1922 . .	4 19 10	5 0 4	2 14 2	2 10 0	1 18 10	2 7 2	1 1 1
1923 . .	2 11 9	2 8 7	0 16 3	2 0 1	0 13 6	1 15 2	0 1 1
Means	3 19 7	4 2 0	1 19 3	1 19 5	1 6 9	1 12 10	0 12 1

EXPERIMENTS WITH RAW ROCK PHOSPHATES.

Experiments to test the agricultural value of raw rock phosphates were commenced at Kybyholite in 1919, the rocks being low grade and containing respectively (a) calcium phosphate, and (b) aluminium phosphate equivalent to about 18 per cent. of phosphoric acid.

Raw Rock Phosphates on Crops to be Harvested.—To test the raw phosphates on crops to be harvested, a rotation consisting of wheat (for hay)-peas, in which both the wheat and pea crops are dressed with the same fertilisers was laid down on some of the poorest land on the farm. The results secured from these plots during the past five seasons are shown in the following tables. It is noticeable that Plot 2, which is treated with lime and superphosphate, is continuing to increase its advantage over the others in producing wheaten hay, and has, this year, produced more hay than all the other four plots added together. On account of the extreme wet conditions, beans could not be got on to the land sufficiently early to warrant the sowing of peas in this field, and consequently the five plots were ploughed up in the spring, and treated as bare fallow.

RAW ROCK PHOSPHATES TESTS ON WHEATEN HAY—PEAS ROTATION.
Wheaten Hay Yields, 1919-1923.

Manuring per Acre.	1919.	1920.	1921.	1922.	1923.
Plot.	T. C. L.	T. C. L.	T. C. L.	T. C. L.	T. C. L.
1. No manure	0 10 84	0 9 0	0 18 84	0 7 21	0 8 11
2. 5cwt. lime and lewt. super	1 6 105	0 17 35	0 18 28	2 4 0	0 18 32
3. lewt. super.	1 7 28	0 13 0	0 17 84	1 12 70	0 1 51
4. lewt. aluminium rock phosphate	1 6 91	0 12 91	0 14 91	1 6 80	0 1 98
5. lewt. calcium rock phosphate	1 3 7	0 11 0	0 12 21	1 1 60	0 2 28

Pea Yields, 1919-1923.

Manuring per Acre.	1919.		1920.		1921.		1922.		1923.		Means, 1919-23.
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	
No manure	0	30	failure		2	51	5	54	not sown		2 19
ats. lime and lewt.											
super	1	17	failure		5	26	15	29	not sown		5 33
fert. super	1	4	failure		7	4	10	45	not sown		4 43
pat. aluminium rock											
phosphate	1	30	failure		7	10	7	51	not sown		4 8
pat. calcium rock											
phosphate	0	39	failure		5	45	5	45	not sown		3 2

In the above hay plots, White Essex wheat at the rate of 80lbs. per acre was sown on May 14th to 15th.

Raw Rock Phosphates on Natural Pasture.—The same two rock phosphates are being tested on natural pasture, on plots $3\frac{1}{2}$ acres in area, and the following table shows the manure applied, the year in which each plot was top dressed, together with the feeding produced, estimated in terms of sheep per acre per annum, for the years 1921 to 1923.

Returns of Natural Grazing Test, Kybybolite, 1921-1923.

Plot.	Manure applied per acre.				
	1919.	1920.	1921.	1922.	1923.
1. 1 ton alum. phos.		nil	nil	nil	nil
2. 11ewts. al. phos.		1cwt. al. ph.	1cwt. al. phos.	1cwt. al. phos.	1cwt. al. phos.
3. 1 ton lime and 1cwt. super		1cwt. super	1cwt. super	1cwt. super	1cwt. super
4. 11ewts. cal. phos.		1cwt. cal. phos.	1cwt. cal. phos.	1cwt. cal. phos.	1cwt. cal. phos.
5. 1 ton cal. phos.		nil	nil	nil	nil
6. No manure		nil	nil	nil	nil

RETURNS OF NATURAL GRAZING TEST, KYBYBOLITE, 1921-1923.—Continued.

Plot.	Grazing.			
	Sheep per acre.			Means,
	1921.	1922.	1923.	1921-23.
1 . . .	1.52	1.47	1.91	1.63
2 . . .	1.64	1.41	1.31	1.45
3 . . .	1.84	2.06	2.50	2.13
4 . . .	1.48	1.20	1.33	1.34
5 . . .	1.33	1.27	1.53	1.38
6 . . .	1.11	0.83	0.50	0.91

This year the plots were grazed simultaneously with comparatively small flocks of sheep during July, August, October, November, December, and January. Plot 3 stood out in contrast to the others during the whole season, producing earlier and thicker growth. Naturalised clovers are becoming plentiful on all the manured plots. Small blocks of each plot were hurdled off from the sheep during the whole year, and a botanical analysis is being made by Mr. E. W. Pritchard, Botanical Assistant of the Horticultural Branch, of all growths appearing on the different plots.

IMPROVEMENT OF PASTURES.

Another set of pasture plots has been set out during the year in Field No 13, in which it is purposed to test an imported phosphate called "Tetraphosphate" against ordinary superphosphate and lime.

The plots are set out for a five-year test, with dressings as follows:

Plot 1.—1ewt. tetraphosphate annually.

Plot 2.—5ewts. tetraphosphate, one application.

Plot 3.—10ewts. lime, one application, and 1ewt. tetraphosphate annually.

Plot 4.—1ewt. superphosphate annually.

Plot 5.—5ewts. superphosphate, one application.

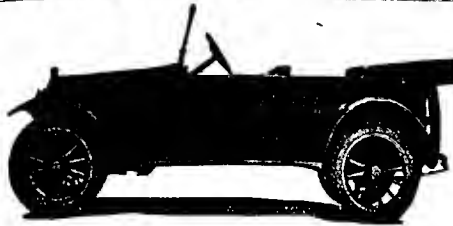
Plot 6.—No manure.

The plots were top-dressed early in July, and some very marked results were quickly noticeable, Plots 4 and 5 standing out prominently, especially with improved clover growth. Plot 5 produced much more feed than Plot 4, but as weather conditions prevented the fencing of the plots sufficiently early, all the plots necessarily had to be grazed together, hence feeding results for each plot are not available for this season.

ROTATION OF CROPS EXPERIMENTS.

Rotation A.—This five-course rotation of 30-acre fields has now been changed to wheat, oats, and three years subterranean clover, and in view of the great promise of this clover; this course should during the next few years, provide some interesting results.

Rotation B.—A six-course rotation has been carried on in a series of 2-acre fields. The rotation is as follows:—wheat; oats and vetches; turnips, oats, or barley; rye grass and clover; rye grass and clover; and one cycle of crops has now been completed. Details of the



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seeding of these plots have already been given amongst the general crop report. The yields of the grain and hay crops, and the turnips grown in this rotation, are as follows:—

Six-Course Rotation of Crops, Kybybolite, 1918-1923.

Year.	Wheat.			Oats and Vetches.			Turnips. Sheep per Acre.	Oats or Barley.		
	B.	L.		T.	C.	L.		B.	L.	
1918 ..	(9A)	8	11	(92)	0	14	12	(9b)	9	4 (oats)
1919 ..	(9F)	11	19	(9A)	0	10	56	(9c)	13	17 (oats)
1920 ..	(9E)	15	24	(9F)	1	15	92	(9b)	11	21 (oats)
1921 ..	(9D)	12	6	(9E)	1	13	35	(9A)	6	22 (oats)
1922 ..	(9C)	20	59	(9D)	1	7	93	(9F)	21	1 (barley)
1923 ..	(9B)	9	21	(9C)	0	14	106	(9E)	24	19 (barley)
Means ..		12	53		1	2	84		10.	6 oats, 4 yrs
									22	35 barley, 2 yrs.

Rotation C.—The Norfolk four-course rotation—turnips, oats, peas, and wheat—has been tested in 4-acre fields of crops. The returns of wheat and oats have been very satisfactory to date from this rotation. The following table shows the returns received for the past five seasons:—

Four-Course Rotation of Crops, Kybybolite, 1919-1923.

Year.	Peas			Wheat.		
	B.	L.		B.	L.	T. C. L.
1919	(4D)	2	31	(4A)	29	26
1920	(4C)	1	32	(4D)	29	50
1921	(4B)	3	14	(4C)	8	40
1922	(4A)	fed off		(4B)		1 13 92
1923	(4D)	21	57	(4A)		1 17 10
						1 5 95
Means ..		7	18		22	39
						1 12 28
	Turnips.			Oats.		
	Sheep per Acre.			Grain.		
	B.	L.		B.	L.	T. C. L.
1919				(4C)	17	4
1920				(4B)	32	27
1921	(4D)	1.74		(4A)	destroyed	
1922	(4C)	2.63		(4D)	30	0
1923	(4B)			(4C)		2 8 30
Means		2.18			19	38
						2 8 30

Rotation D.—A six-course rotation—peas; wheat; turnips; oats; or barley; clover; barley, or oats—has been under test in 9-acre fields. This series was commenced in 1920, and returns to date are as follows:—

Six-Course Rotation of Crops, Kybholite, 1920-1923.

Year.	Peas.			Wheat.			Turnips, Sheep per Acre.		
	R.	L.		R.	L.				
1920 (6F)	Failure			(6A)	17	59			
1921 (6E)	13	5		(6F)	18	44	(6A) 1.75		
					T.	C.	L.		
1922 (6D)	19	26		(6E)	2	11	49	(6F) 1.58	
1923 (6C)	6	10		(6D)	1	11	20		
	<hr/>			<hr/>			<hr/>		
Means ..	9	40		18bush. 24lbs. 2 ton 1cwt. 34lbs.			1.66		
	Oaten Hay.			Clover, Sheep per Acre.			Barley.		
		T.	C.	L.			R.	L.	
1920 (6C)	1	5	5				(6E)	6	18
1921 (6B)	1	2	32	(6C)	1.98		(6D)	5	7
1922 (6A)	1	18	39	(6B)	1.39		(6C)	17	22
1923 (6B)	0	10	65	(6A)	1.01		(6F)	11	33
	<hr/>			<hr/>			<hr/>		
Means . .	1	4	7	1.46			10	7	

RESULTS OF LIMING AT KYBOLITE, 1919-1923.

The following table shows the average returns for various crops received this season from all fields that have been limed during the last seven years, in comparison with those received from all fields that have never been limed:—

Return from Crops on Limed and Unlimed Areas, Kybholite, 1923.

Variety of Crop.	Acres.	Limed.			Acres.	Unlimed.		
		T.	C.	L.		T.	C.	L.
Ensilage	5.90	2	18	37	25.76	2	12	23
Hay	56.12	1	1	47	46.28	0	9	100
			B.	L.			B.	L.
Wheat	0.94		9	21	6.78		3	32
Oats	28.34		4	27	7.00		13	28
Barley	12.75		13	30	—		—	
Peas	12.95		11	11	—		—	

A PEAR TREE CANKER.

[By GEOFFREY SAMUEL, B.Sc., Lecturer on Plant Pathology,
University of Adelaide.]

South Australia is peculiarly free from canker diseases of fruit trees. The very destructive "apple canker" (*Nectria galligena*) of Europe and America is unknown here, as also are the less dangerous, but nevertheless important, black-rot canker, blister canker, bitter-rot canker, apple-blotch canker, superficial bark canker*, and several others.

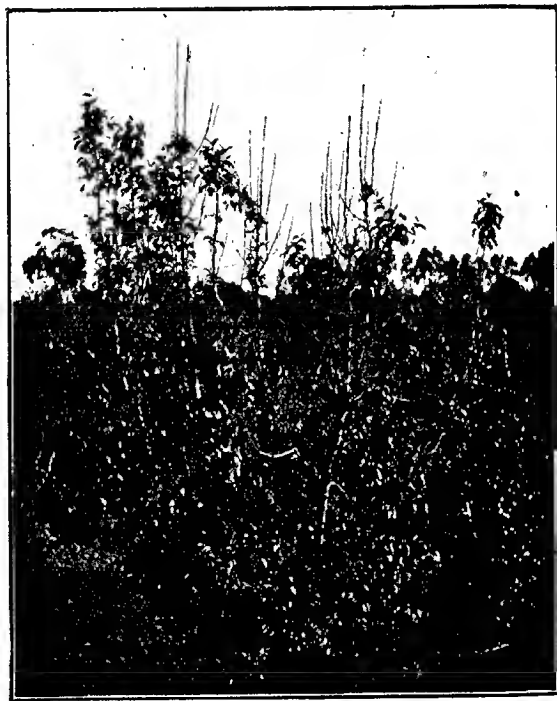


Fig. 1.—Beurre d'Angleterre pear tree, with upper branches killed back during the winter by *Coniothecium* cankers on the bark.

There is one type of canker which occasionally occurs here, however, both on apples and pears. Hitherto only comparatively isolated specimens of this have been found, but during the winter just past

* *Sphaeropsis malorum*, *Nummularia discreta*, *Glomerella rufomaculans*, *Phyllosticta solitaria*, *Myxosporium corticolum*.

one of the pear trees at the Government Experimental Orchard at Coromandel Valley became badly affected, and many twigs died back a considerable distance under the attack. This disease does not exactly correspond with the description of any other pear-twig disease which can be found in the literature on this subject in Adelaide, so that some account of it as it occurs in South Australia will be given.

SYMPTOMS.

On examining the Beurre d'Angleterre pear tree which became badly affected at Coromandel Valley (Fig. 1), it was found that the cankers almost invariably commenced at a leaf scar on a twig, or at the junction of a twig and a branch. The cankers had a definite raised margin, and gradually increased in size from the leaf scar or twig junction as a centre, eventually girdling the stem, and continuing to extend upwards and downwards (Fig. 2). Just beyond the margin



Fig. 2.—Cankers on twigs of the tree shown in Fig. 1, showing peeling off of the skin (epidermis) of the bark, and exposed black layer beneath.



Fig. 3.—Cankers on apple twigs from the River Murray.

of the cankers the bark was perfectly sound, but just within the margin the skin (epidermis) of the bark had flaked off, or could easily be pulled off, exposing a dull black area beneath. Towards the top of the affected branches the cankers had completely girdled them.

sometimes for a distance of 6 in. or more. Lower down, however, the cankers were only circular or oval patches of various size round the infection centre, as though they had started more recently.

The cankers made fairly rapid headway during the winter, which was exceptionally wet. When spring came practically none of the branches gave shoots above where they had been girdled by the disease, and twigs lower down, springing from smaller cankers also usually failed to shoot (in many cases the canker had run up the side twig girdling it first). The tree was then heavily pruned, and all the most badly affected wood removed, though it would have been too severe to prune it right down below the smallest cankers. These small cankers left, when examined two months later, did not seem to be making further headway, and will most probably be flaked off in time by the bark.

Similar, but less severe, cankers have been found from time to time on apples and pears from several parts of the State. They usually grow much more slowly, sometimes showing a slight concentric zonation (Fig. 3). They are usually noticed and removed during the annual pruning.

CAUSE OF THE DISEASE.

A small scraping from the blackened area in a canker where the skin has flaked off, when examined under the microscope, shows that the blackening is largely due to the presence of thousands upon thousands of little irregular black packets or aggregations of cells of a fungus (Fig. 4). This simple fungus, consisting only of various-sized packets of dark-colored cells, is a *Coniothecium*. No other fungus could be found in connection with the cankers, even when they were kept in a moist jar for two months. (No pycnidia or perithecia have ever been found on cankers.)

A section through the edge of a canker is illustrated in Fig. 4. It can be seen that the fungus grows just underneath the skin of the bark, killing the bark cells for some distance below, and causing the skin, or epidermal layer, of the bark to flake off. The section was made about two months after the new spring growth of the trees had started, and it is probable that the layer of cork, *c.e.*, had been recently formed to cut off the injured part of the bark. During the winter, when the cankers increased in size so rapidly, it is probable that the tree did not possess the activity to form such a cork layer to cut off its enemy, but was only able to do so as soon as a little of the warmth of spring came to start growth once again.

There has been a *Coniothecium* fungus described as causing an apple branch canker and a scabbing and cracking of the fruit, from South Africa, Europe, and New Zealand. This fungus has been named *Coniothecium chomatosporum*, Corda. But the description of its effect on the bark does not correspond exactly with the South Australian cankers. It is described as causing small dark specks, or reddish-brown irregularly raised blisters, which later burst, exposing a black layer beneath. Moreover, in South Australia no attack upon the fruit has yet been observed. Also Masscet has described two other

more forms (*Phoma* and *Diaporthe*) connected with the disease, either of which have been found in South Australia. Until a careful comparison of these two fungi has been made, therefore, one hesitates to attribute the cause of the South Australian cankers definitely to *Coniothecium chomatosporum*, though it may well be that the differences are only attributable to another manner of growth of the fungus under the different conditions here.

The fungus has been obtained in pure culture, and on malt extract agar grows with a certain amount of mycelium, but much budding. It is peculiar in that the colonies are at first white, but later the cell-packets arising from one or more hyphal branches of a colony may turn black, while the rest of the colony remains white. Also in a contaminated plate, all the *Coniothecium* colonies in the vicinity of certain impurity-colonies may turn completely black.

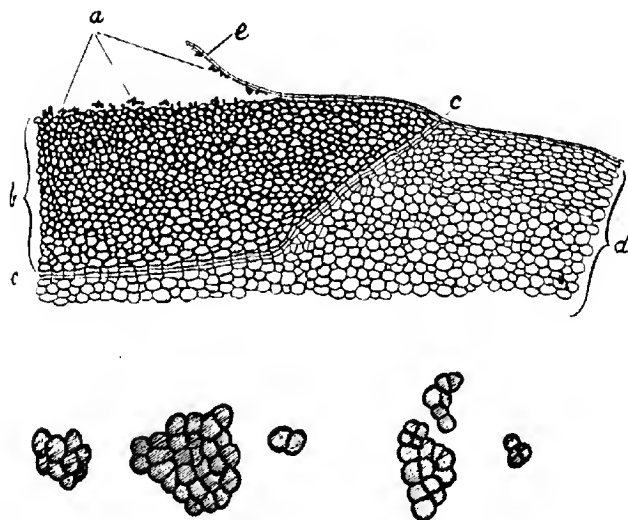


Fig. 4.—Above—diagrammatic section of the edge of a *Coniothecium* canker; a, packets of cells of the disease-producing fungus; b, bark cells killed by the fungus; c, layer of cork cells formed by the plant in spring to cut off the dead cells; d, still healthy bark; e, skin (epidermis) of bark flaking off.

Below—Various shaped cell-packets of the *Coniothecium* fungus (a, in figure above more highly magnified).

CONTROL.

In the case of canker diseases on twigs the only control is to cut them right out. If the cankers are multiplying at all, a winter spray of copper sulphate or Bordeaux mixture should be given; but except

in the case of the one tree at Coromandel Valley last year, this canker has not done great harm to trees in South Australia. It is probable that the exceptional weather conditions of last winter, combined with a rather greater susceptibility of this variety of pear, explain the sudden and unusual attack. It is the only tree of this variety grown at the orchard. The cankers also occurred in less severe form on one or two other trees this season.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during February.	Per Cow during February.	Per Cow August to February.	Per Herd during February.	Per Cow during February.	Per Cow August to February.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	15	15	6,162.5	410.83	3,745.22	282.67	18.84	14.4
2/B	9	9	4,437	493.00	5,699.83	260.33	22.26	20.0
2/C	16	9.93	2,558.5	159.91	3,412.25	127.11	7.94	10.0
2/E	12	12	6,583	548.58	4,565.42	279.06	23.26	18.9
2/H	24	24	13,246.5	558.62	4,668.16	594.87	24.21	18.2
2/I	14	14	6,873	490.93	4,837.74	293.66	20.98	18.0
2/J	13	13	9,120.5	701.58	6,043.10	370.39	28.49	20.0
2/K	24	21.97	10,121.5	421.73	4,164.03	422.31	17.60	15.2
2/L	24	20.31	11,175.5	465.64	3,049.01	529.10	22.05	15.7
2/O	33.66	20.76	8,997	267.29	3,332.48	369.60	10.98	15.6
2/R	16	16	11,629	726.81	7,086.09	465.76	29.11	23.8
2/S	6	6	4,509.5	751.58	5,697.61	202.05	33.68	24.3
2/T	12	11.41	8,069	672.42	5,475.38	323.20	26.93	20.2
2/U	17	15.69	7,948	467.53	5,577.65	323.56	19.03	16.7
2/V	21	17.97	6,421.5	305.78	3,214.92	274.47	13.07	12.2
2/W	16.52	13.83	5,681.5	343.91	5,903.72	240.69	14.57	21.0
2/X	Withdrawn from Association.							
2/Y	12	11	6,786	565.50	5,402.92	303.09	25.26	20.0
2/Z	12	10.52	4,573	381.08	4,298.01	201.90	16.83	17.0
2/Aa	Withdrawn from Association.							
2/Bb	9	8.31	3,240.5	360.06	3,925.00	135.07	15.01	18.8
2/Cc	13	13	4,683.5	360.27	3,511.32	233.32	17.95	18.5
Means	15.96	14.19	7,140.83	447.45	4,488.30	308.61	19.34	17.5

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1924.

No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during January.	Per Cow during January.	Per Cow October to January.	Per Herd during January.	Per Cow during January.	Per Cow October to January.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
	31-94	31-48	27,474	860-37	3,362-91	1,064-53	33-33	125-82
	21-32	15-23	9,571	453-50	2,007-75	407-44	19-31	89-39
	19	18-13	11,483-5	603-85	2,754-00	533-05	28-03	118-31
	22	16-81	9,781	444-59	1,604-56	486-41	22-11	81-84
	18	18	9,579	532-17	2,261-62	436-76	24-26	104-61
	15	10-03	8,462-5	564-17	1,953-38	392-56	26-17	98-69
	17	16	8,881-5	522-24	2,163-43	343-06	20-18	83-33
	18-97	10-16	11,460	604-11	2,509-28	513-19	27-05	115-33
	20-10	14-74	8,963	445-92	2,176-71	394-66	19-63	99-56
	23	21-13	11,291-5	490-93	2,123-11	479-11	20-83	90-05
	25-13	20-13	12,787	508-83	2,453-86	576-92	22-96	107-68
	11	10	6,138	558-00	2,610-65	291-22	26-47	120-51
	12	12	8,184	682-00	2,957-96	343-09	28-59	122-02
	12	12	5,323-5	693-62	2,960-40	366-93	30-58	134-17
	13	11-58	9,142	703-23	2,923-74	423-06	32-54	125-73
	13	10	6,928-5	532-96	2,532-65	330-38	25-42	108-46
	15	11-90	8,612-5	574-17	2,128-97	365-76	24-38	91-48
	14	12-45	10,559	754-21	2,604-92	457-71	32-69	114-01
	15	13-94	9,194	534-82	2,286-71	368-65	21-54	101-63
	17-26	16-81	11,119-5	648-01	2,451-72	530-53	30-91	114-98
ALL	17-69	15-43	10,396-75	587-85	2,442-84	455-25	25-74	106-45

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GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1924

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during February.	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	16	10,570.5	621.79	4,260.57	434.95	25.59	15.5
3/B	16	15.41	6,334.5	395.91	2,019.48	271.56	16.97	15.5
3/C	12	12	6,873	572.75	3,925.14	293.61	24.47	15.5
3/D	11.38	11.38	7,247	636.81	2,850.85	285.72	25.11	15.5
3/E	15	13.90	10,059.5	670.63	3,138.30	403.44	26.90	15.5
3/F	9	8	4,886.5	542.94	3,453.24	205.35	22.82	15.5
3/G	10	10	6,003	600.30	3,684.20	239.60	23.96	15.5
3/H	16	16	8,772.5	548.28	3,060.99	362.46	22.65	15.5
3/I	14	13.59	6,492.5	463.75	3,120.21	285.80	20.41	15.5
3/J	14.66	14.38	4,994	340.65	2,162.51	242.50	16.54	15.5
3/K	21.10	21	8,961	424.69	3,077.89	427.01	20.24	15.5
3/L	19.24	18.24	7,985	415.54	2,850.96	384.38	19.98	15.5
3/M	14	12.03	4,875	348.21	2,829.67	220.42	15.71	15.5
3/N	20	19	8,033	401.65	2,804.61	389.74	19.49	15.5
3/O	17	15	9,976	586.82	2,730.10	372.88	21.93	15.5
3/Q	59.79	58.79	17,536	293.29	2,954.86	895.86	14.98	15.5
3/R	18	17.10	9,437	524.28	3,553.03	415.70	23.69	15.5
3/S	12	11	4,567.5	380.62	862.24	216.06	18.01	15.5
Means	17.57	16.82	7,978.53	454.23	3,045.89	352.61	20.67	15.5

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TOBACCO IN SOUTH AUSTRALIA.

From the earliest days of the establishment of South Australia, attempts have been made to grow tobacco. On the plains of Adelaide, in the neighboring hills, on Yorke Peninsula, in the North, Tatiara, and in the Millicent district, where something over 30 years ago some Chinese took up land for the purpose, the plant has been cultivated. That the tobacco will thrive in this State appears to have been amply demonstrated, but at no time does it appear that its cultivation approached anywhere near being placed on a commercial footing.

In 1920 a revival of interest occurred as the result of a visit to South Australia of the Tobacco Expert of the Victorian Department of Agriculture (Mr. Temple A. J. Smith). This officer, at the request of the South Australian Department of Agriculture, visited certain localities in the Southern and Hills districts, and, as a result of his inspection, reported favorably on the prospects of this crop in several districts.



Portion of a Crop of Light Plug (Virginian Golden Leaf) Tobacco Grown by Mr. W. A. Gordon, Paris Creek.

Following on this report, the Department of Agriculture co-operated with landholders in the conduct of experimental tests. Of these the most successful was the work done by Mr. W. E. Daddow, at Mount Barker.

During 1921 and 1922 Mr. Daddow grew and cured a quantity of leaf. In 1921, from an area of one-third of an acre, he picked 232½ lbs. of leaf (cured weight), which was sold for £26 19s. 1½d., equivalent to a return of £80 17s. 4½d. per acre. In 1922, from one-quarter of an acre, he harvested 130½ lbs. of leaf (cured weight),

which was sold for £14 1s. 10½d., equivalent to a return of £56 7s. 6d. per acre. The price secured for first quality leaf each year was 2s. 3d. per lb., with a bonus of 3d. per lb.

The leaf marketed by Mr. Daddow was flue cured, and, so far as can be ascertained, this was the first occasion on which this method of curing had been attempted in South Australia. The process appears to be one involving care and a measure of personal experience on the part of the operator. That it is an absolute essential to the profitable undertaking of tobacco leaf production on a commercial scale, however, is demonstrated by the difference in price paid for flue cured leaf, viz., 2s. 3d. per lb. for first quality, and that paid for the air dried, viz., 7d. per lb.

The results secured at Mount Barker have encouraged the view that tobacco culture presents very favorable prospects in certain parts of the State, and, as a consequence, the Department of Agriculture has endeavored to stimulate interest in it in those localities in which it believes it can be made profitable. With this end in view, during the current season, it has supervised plots, which are being conducted by Mr. P. C. Head, of Woodside, Mr. E. A. Hunt, at Mount Barker, and Mr. W. A. Gordon, of Paris Creek.

These plots were visited during the month by the Director of Agriculture (Professor Arthur J. Perkins), the Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis), and the Field Officer (Mr. S. B. Opie), who has exercised a direct personal oversight over the cultural operations in each case.

On Mr. Head's property there is an area of 1½ acres planted to Warne, White Stem Orinoco, and White Burley varieties. The first named is a cigarette and light plug type, and the last named two light plug types. The seed was procured from the South Australian Department of Agriculture, which was courteously supplied with the different types by the Victorian Department of Agriculture last year. The plants were grown in seedbeds 9 sq. yds. in area, the seed having been sown in early September. The plants were lifted on December 15th and set out 3ft. apart in rows at intervals of 3ft. The greater portion of the area was dressed with 2cwt. super, lewt. dried blood, and ½cwt. sulphate of potash per acre prior to the planting. Portion of the crop planted without any manurial dressing was much inferior in growth to that which had received an application of super. Subsequent to planting, the crop was cultivated between the rows with the Planet Junior on four occasions.

At the time it was inspected the tobacco generally appeared to be in a thriving condition, although somewhat irregular in growth. There was no indication of disease of any sort. The variety which appeared most promising was Warne. Mr. Head proposes to flue cure the crop, and for the purpose is adapting a shed at present on the holding.

At Mount Barker Mr. E. A. Hunt has an area of approximately 3 acres under the same varieties as are being grown by Mr. Head. Mr. Hunt sowed seed at intervals between October 4th and December

22nd. and commenced planting out on the latter date. The field was dressed with 2cwts. super per acre, 1cwt. dried blood, and ½cwt. sulphate of potash prior to planting, and subsequently cultivated at intervals as occasion required. There is every indication that Mr. Hunt will pick a satisfactory crop, and this he proposes to cure in a concrete barn being erected according to plans prepared by the Department of Agriculture.



Flue Curing Barn Erected by Mr. W. A. Gordon for Flue Curing his Tobacco Crop at Paris Creek.

In addition to Warne, White Stem Orinoco, and White Burley, Mr. W. A. Gordon, of Paris Creek, is growing another variety, Virginian Golden Leaf. He has an area of approximately 3 acres under tobacco. The seed was sown at intervals between September 22nd

and October 7th. The field, which in 1922 carried peas and in 1923 oats, was ploughed up on September 2nd, and subsequently again in the second week of October. On November 10th it was cultivated and harrowed, cross ploughed on November 24th, harrowed down, and a commencement made with planting on November 25th, which was continued at intervals until the middle of January. The Planet Junior was worked freely between the rows until the plants became too large for the operation to be conducted without danger of damaging the plants.

The first picking of the leaves has already been taken and cured out. For this purpose Mr. Gordon has built a barn of red gum slabs and galvanized iron, lined with ruberoid. Heat is generated in two underground furnaces, burning locally grown timber. The process of curing the first barnfull took 3½ days, and the leaf is now ready for hulking down. Mr. Gordon has adopted the priming method, which consists of picking individual leaves as they ripen, as against the system of cutting the whole plant at the time at which the greater proportion of the leaves have reached maturity.

No feature associated with the tobacco crop in this State this year is more encouraging than the very satisfactory development of the plants in seedbeds. In the neighboring States of Victoria and New South Wales the area planted to tobacco was very much less than would otherwise have been the case because of the shortage of plants occasioned by the development of the fungous pest known as blue mould. This serious pest, so far as can be ascertained, did not appear in any of the seedbeds in South Australia this year. On the contrary, the germination and subsequent growth were such that in each case referred to above the growers had many more plants than were necessary to cover the area which they contemplated planting.

In the fields, likewise, the tobacco is free from disease and, with the exception of very slight damage done by caterpillars, has suffered little damage from insect pests.

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ORCHARD NOTES FOR SOUTHERN DISTRICTS.

[By C. H. BEAUMONT, Orchard Instructor.]

April generally sees the last of gathering the fruit crop. The late varieties of apples are better off the trees than left to the weather. Mark any tree that has shown itself to be worth reproducing; you can then work from it with the certainty of getting something good. With the object of testing suggested methods of controlling scab or *Ascladium dendriticum*, from a number of trees all the windfalls and leaves were raked into a furrow between the rows of trees and were dried; in another lot of trees the leaves, &c., were raked and picked and burned; a further trial was made by spraying the fallen leaves with fruit, turning them over as well as could be done quickly. Three years' work showed that to spray the fallen debris or to rake it up and to burn it reduced the quantity of scab by 70 per cent.; raking and drying in a furrow between the rows reduced the infection by 30 per cent. The spray used was "lime sulphur," winter strength. It is also asserted that "downy mildew" can be controlled to a great extent by similar procedure.

Be ready to plant new trees as soon as the nurseryman can lift them. Dig the holes open, and a stiff stake driven in the centre of the hole, making replacements in a grown orchard, cart in new soil for the young tree; a small amount of stable manure or bone dust may be added in the bottom of the hole before the soil is filled in, but not so close to touch the roots.

Old apricot trees in many parts of the district are losing big limbs. This is caused by root trouble, and an endeavor should be made to loosen the soil deeply about the tree and fertilise it with bone dust or super. Cut the dead or dying limb clean out, and make a clean cut with a sharp knife at the back, then paint with an asphaltum paint or thick white lead.

Pruning will be commenced; remember that bearing trees require light pruning, the main thing necessary is to do away with cross limbs which are likely to cause damage to the fruit; also remove rough bark which may harbor disease. Sick trees should be grubbed and burned.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, March 12th, 1924, there being present Messrs. C. J. Tuckwell (Acting Chairman), A. M. Dawkins, H. Wicks, F. Coleman, J. W. Sandford, W. J. Colebatch, P. H. Jones, H. S. Taylor, and the Secretary (Mr. H. J. Finnis).

Apologies were received from the Chairman (Mr. W. S. Kelly), the Vice-Chairman (Capt. S. A. White), the President of the R.A. and H. Society (Hon. W. G. Duncan), and the Chief Inspector of Stock (Mr. C. A. Loxton, B.V.Sc.).

Distribution of Seed Wheat.—The Board decided to refer the resolution of the Owen Branch—"That the Government adopt the New South Wales system of distribution of seed wheat"—to the 1924 Annual Congress.

Manufacture of Fruit Cases.—The S.A. Fruitgrowers and Market Gardeners' Association, who were asked to comment on the advisability of making standard fruit cases with soft wood ends, intimated that members of the association were opposed to the proposal. The Board decided to advise the Branch that, as a result of inquiries made, it was of the opinion that no practical good would result from the adoption of the idea.

Inspection of Apples in Packing Sheds.—The Balhannah Branch asked whether arrangements could be made for inspecting in packing sheds apples for export. The Horticultural Instructor reported that he had suggested to the Federal authorities that certain local sheds should be gazetted "appointed places," with the object of testing the idea. The Secretary was directed to ascertain whether the suggestion of the Horticultural Instructor had been adopted.

Horehound as Noxious Weed.—The 1923 Congress of the Agricultural Bureau carried the following resolution:—"That the plant known as 'horehound' should be proclaimed a noxious weed." The resolution was moved by the Gladstone Branch, but before making any suggestions to the Minister, the Board were anxious to obtain local information regarding the prevalence of the plant, and on the motion of Mr. H. S. Taylor, seconded by Mr. H. Wicks, it was decided that the resolution should be brought before the Mid-Northern Conference.

Suggested "School" for Rural Women.—At the 1923 Conference of Lower Northern Branches, the Board was asked to arrange for a short rural household science course of instruction for women. The Secretary submitted suggestions and a draft syllabus, which he had prepared, and on the motion of Mr. F. Coleman, seconded by Mr. W. J. Colebatch, it was decided to seek the approval of the Minister of Agriculture thereto.

Judging Papers at Bureau Meetings.—A communication was received from the Miltalie Branch, intimating that it was proposed to give prizes for papers contributed during the ensuing year, and

asking that the papers should be judged by members of the Advisory Board. The Secretary was instructed to inform the Branch that the Board would undertake to provide judges for this purpose.

Experimental Plots for Tantanoola.—The Tantanoola Branch asked that local experimental plots might be established in order to demonstrate the potentialities of the district in regard to the utilisation of waste water for summer irrigation. It was decided to refer the matter to the Director of Agriculture for a report.

Afforestation.—Mr. F. Coleman gave notice that at the next meeting of the Board he would move—"That the Board recommends the appointment of a Board of Forestry."

Preservation of Timber on River Murray.—Mr. H. S. Taylor, in bringing this matter under the notice of the Board, stated that the impending shortage of timber supplies in the vicinity of the river was causing a good deal of serious concern to the settlers. The Irrigation Commission had control of the timber, and in order that further information should be made available, he moved that the Secretary obtain information with respect to the following points:— (a) What are the areas at present under the control of the Irrigation Commission as regards the matter of fuel? (b) What is the nature of the control? (c) Is it within the competence of Parliament, or the Minister, or any other body, to formulate a policy that will effect

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the preservation of the timber, or is the matter wholly and solely in the hands of the Commission? (d) If Parliament has no real control, or in any case if it has or has not, to what extent would the Commission be prepared to consider suggestions from the Advisory Board dealing with the conservation of timber on the river? Motion carried.

Letter of Sympathy to Capt. S. A. White.—On the motion of Mr. A. M. Dawkins, seconded by Mr. H. Wicks, the Secretary was instructed to forward a letter of sympathy to the Vice-Chairman of the Board (Capt. S. A. White), who has been unwell for some time.

Life Membership.—The name of Mr. F. Masters, of the Robert Verran Branch, who has been connected with the Agricultural Bureau for 21 years, was added to the roll of life members of the Agricultural Bureau.

New Branches.—Approval was given for the formation of Branches of the Agricultural Bureau at Charra and Brinkworth, with the following gentlemen as foundation members:—Charra—E. T. Mea, G. W. Denton, F. Haseldine, W. Wright, W. Tudor, W. Schultz, Schultz, E. A. Payne, A. Haseldine, A. J. Hantke, G. Tudor, R. T. E. O. Wahl, S. Osborn, F. B. Haseldine, L. Dunnet, G. Brooks, Schultz, E. A. Denton, Brinkworth—G. E. Ottens, P. H. Ottens, C. C. T. Ottens, J. H. Ottens, O. F. Ottens, W. F. Ottens, G. Everett, J. S. Weckert, W. J. Wilke, E. J. Hoepner, W. R. W. Graft, S. T. Wooldridge, C. A. Waldhuter, T. G. Chesson, E. I. Chesson, G. Adams, F. W. Heinrich, F. A. Klem.

Branch to be Closed.—It was decided to close the Northfield Branch.

New Members.—The following names were added to the rolls of existing Branches:—Murray Bridge—E. B. Thiele, J. G. Lehmann, Cooke; Poochera—T. McCormick, S. E. Laird, J. Ward, W. E. Smart; Waikerie—P. D. Henderson, G. H. Fullwood, G. A. Reaby; Mannararie—H. W. Lang, W. Harding & Sons, S. Hall, A. Campbell; Renmark—G. E. A. Russell, W. K. Tamblin, W. E. Mount, V. T. McLean, H. H. Hillstone; Kringin—H. J. Palmer, C. S. Cant; Paskeville—A. G. Bussenschutt, W. H. Price, G. H. Conynner; Tawandale—A. B. Schapel, W. O. Pfeiffer, P. E. Henschke, H. T. Henschke, G. A. Mieglick, E. W. Smith, H. J. Boerth, C. A. H. Schoell, L. L. Watkins; Mount Gambier—A. Stafford, C. Kennedy; Nelshaly—J. Hartnett; Lameroo—F. J. Duffet, L. A. Cornish; Clare—C. F. Johncock; Rockwood—K. R. Holdsworth; Talia—N. Boylan; Moor Barker—A. Hemmingson, — Jenner; Georgetown—E. E. Lang, W. H. Cronk, F. W. Phillips, D. M. Davoren; Tantanoola—G. S. Hall; Booleroo Centre—R. F. Fitzgerald; Lyndoch—H. G. Field; Linton; Currency Creek—N. Holme, S. E. Skewes; Monarto South—E. Zennert; McLachlan—Rev. Owen, J. Lightfoot, R. Priest; Perv—F. E. Sansome, S. Milman, W. Nunn, J. McCormack; Robert Verran—A. Smith; Light's Pass—A. Schmidt, C. Schultz; W. Patebing, W. Guitz; Mundalla—R. Dinning, J. Haynes; Shoal Bay—R. L. Turner, O. Turner.

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(Late of Federal Taxation Dept.).

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., FEBRUARY, 1924.

IMPORTS.

Interstate.

Apples (bushels)	59
Bananas (bushels)	10,576
Lemons (bushels)	2
Mangoes (bushels)	3
Oranges (bushels)	1
Passion fruit (bushels)	40
Peaches (bushels)	1
Pines (bushels)	882
Plums (bushels)	2
Tomatoes (bushels)	2
Onions (bags)	2,182
Potatoes (bags)	4,823
Bulbs (packages)	22
Plants (packages)	8
Seeds (packages)	46
Wine casks, empty (number)	3,808

Rejected—153bush. bananas, 1bush. apples, 2bush. tomatoes,
3 secondhand cases.

Fumigated—33 wine casks.

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	4,917
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EXPORTS.

Federal Commerce Act.

Twenty-five packages dried fruit, and 1551 packages apples were
exported to overseas markets. These were consigned as follows:—

London.

Apples	1,235
------------------	-------

India and East.

Apples	316
Dried fruit	25

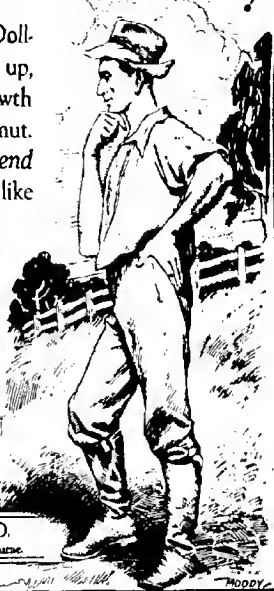
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THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF MARCH.

The following reports on the general Agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:—

Kybybolite.—Weather has been fairly seasonable, although temperatures generally have been lower than usual for the month, and the rainfall has been above the average. Two nice rains were recorded,—one early, and one later in the month. Over 5in. of rain have now been received for the first three months of the year, a record for this period of the year for the Farm. Crops—Good areas have been prepared during the month for this year's cereals and for sowing the subterranean clover. Turnip crops have grown really well during the month, as also have mangels and lucerne under irrigation. Subterranean clover germinated really well from the February rains, and has grown splendidly during March. Natural feed is very plentiful, and nice and green.

Eyre's.—Weather—Thirty points of rain for the month over three raining days. Winds very changeable and bad for burning generally. Weather generally cool, with odd warm days and several misty mornings. Crops—Have not heard of any settlers having started seeding, other than a few acres of barley for green feed. Clearing and ploughing are general, and seeding will soon be in full swing. Quite a fair amount of the area to be cropped this year cannot be ploughed until rain comes. Quite a number of settlers are water carting. Natural Feed—All very much dried off and of little feeding value. Stock—All stock are in very good order. Pests—Rabbits are numerous, but settlers have been poisoning, which should be very useful considering there is little for the rabbits this dry weather. Miscellaneous—There are prospects of a large area being seeded in this district.

Turretfield.—Weather—The weather this month has been remarkably cool, and many days were damp and cloudy; 127 points of rain were registered. Crops—The grape crop is very late and picking is only just beginning. In some vineyards the fruit is hardly ripe. Natural Feed—There is very little natural feed; the rains made the grass shoot, but no growth has been made. Pests—Stinkweed has made very strong growth and is giving trouble to those breaking up stubble land. Miscellaneous—Farmers are busy cleaning up the fallows as weeds are very thick this year.

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DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on April 1st, 1924:—

BUTTER.—Supplies have kept up remarkably well throughout the month, just ended, and instead of there being a shortage of local top-grade butter as usual in other years, the production in this State has been sufficient to meet requirements. There has also been a small surplus available for export, which is being sold or consigned to London. There is a shrinkage, however, now taking place in supplies each week and top grades may have to be augmented by importations from the Eastern States at an early date. Values are lower in sympathy with the rates obtaining in London, and also because of the markets in Victoria, New South Wales and Queensland having eased. Values being:—Choice factory and creamery fresh butter, in bulk, 1s. 3½d.; first-grade bulk, 1s. 2½d.; second and third grade bulk, 10d. to 10½d.; best separators and dairies, 1s. 1½d. to 1s. 3d.; fair quality, 1s. ½d. to 1s. 1d.; store and collectors' lines, 11d. to 1s. ½d.; heated lots, 10d. to 10½d.

EGGS.—Values are now considerably firmer than when last reported, the usual seasonable advance having taken place. Supplies are now shrinking, so that higher figures may be looked for as the winter approaches. Quotations at the end of month:—Fresh hen, 1s. 5½d.; duck, 1s. 6½d. per dozen.

CHEESE.—Unfortunately, there has been a slump in prices in connection with this commodity. Each of the producing States has a surplus above local requirements, and it looks as though fairly heavy quantities will have to be shipped to London to ease the position. The market there is also somewhat over-supplied, and values are lower than have ruled for some time past. The range here is now 8½d. to 10d. per lb.; semi-matured to matured, 11d. to 1s.

HONEY.—A firming in rates of top-grade honey eventuated in the early part of the month, resulting in better supplies coming to hand, and prime clear extracted, in liquid condition, is now selling at 5d. to 5½d.; best quality candied lots 4½d. to 5d.; lower grades, 2½d. to 3d.; beeswax, readily saleable at 1s. 4d. to 1s. 4½d. per lb.

ALMONDS.—A better turnover was experienced towards the end of the month, export buyers operating fairly extensively. Values range at present as follows:—Brandis, 8½d. to 9d.; mixed softshells, 7½d. to 8d.; hardshells, 4d. to 4½d.; kernels, 1s. 7½d. to 1s. 8d.

BACON.—With values ruling high for the live animal, rates are again firmer. Supplies of local middles are short of requirements, and there is a better call for Hutton's "Pineapple" brand in consequence. Best factory cured sides, 1s. 4d. to 1s. 4½d.; best factory cured middles, 1s. 8d. to 1s. 8½d.; best factory cured rolls, 1s. 3½d. to 1s. 4d.; hams, 1s. 7d. per lb.; Hutton's "Pineapple" brand hams, 1s. 8d. per lb. Lard.—Hutton's "Pineapple" brand lard, in packets, 1s.; in bulk, 11d. per lb.

LIVE POULTRY.—The quantities marketed at each sale have been fairly heavy, but there is still a demand for much larger supplies. For any stock which were in prime condition excellent prices were realised, whilst for medium and poorer sorts values well maintained. As poulterers, restaurant keepers, and produce dealers are expecting an extra heavy call for Easter, consignors would be well advised to forward supplies straight away as satisfactory rates are sure to rule. Rates obtainable on application. The following values ruled at our last auction:—Prime roosters, 5s. to 7s. 3d. each; nice condition cockerels, 3s. to 4s. 9d. each. Poor condition cockerels, 2s. to 2s. 9d.; plump hens, 3s. 3d. to 5s.; medium hens, 2s. 6d. to 3s.; light hens, 2s. to 2s. 3d.; geese, 5s. 6d. to 6s. 6d.; ducks, good condition, 4s. to 6s. 3d.; ducks, fair condition, 2s. 6d. to 3s. 9d.; turkeys, good to prime condition, 1s. 2d. to 1s. 8d. per lb. live weight; do., fair condition, 1s. to 1s. 1½d. per lb. live weight; do. fattening sorts, lower; pigeons, 7d. to 11½d. each.

POTATOES.—Prime new Victorian potatoes at 8s. to 9s. per cwt. on rail. Nib End.

ONIONS.—Best quality onions at 9s. 6d. per cwt. on rail.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of March 1924, also the average precipitation to the end of March, and the average annual rainfall.

Station	For March, 1924.	To end March, 1924.	Av'ge To end March, 1924	Av'ge Annual Rainfall
PAB NORTH AND UPPER NORTH.				
Adelaide	—	0.74	1.90	4.94
Archie	—	1.02	1.43	6.07
As	0.01	0.82	1.74	6.66
Bar	—	0.81	1.94	8.39
By	—	0.52	2.19	8.97
Can	—	0.92	2.60	12.53
Col	0.12	1.45	1.81	7.74
Con	—	0.86	2.05	13.46
For	0.04	0.95	1.88	12.92
Ge	—	1.55	1.98	12.68
He	0.19	1.77	2.34	11.55
Ho	0.21	1.80	2.03	14.21
Mo	0.36	2.92	1.84	9.67
Augusta	0.37	2.68	1.75	9.71
Augusta West	0.22	1.90	2.04	10.77
Em	0.31	2.32	2.11	11.91
Em	0.22	3.14	2.39	18.39
For	0.27	2.76	2.31	12.57
For	0.41	4.13	3.27	23.40
For Centre	0.38	3.03	2.14	15.65
Germe	0.43	2.77	1.95	12.89
Germe	0.49	3.58	2.41	19.78
Germe	0.52	4.95	2.05	15.00
Germe	0.05	1.15	1.93	11.52
Germe	0.30	2.13	2.07	12.90
Germe	0.45	1.67	1.80	10.91
Germe	0.23	1.86	2.16	13.54
Germe	0.23	1.64	2.40	13.73
Germe	0.25	1.37	2.45	11.99
Germe	0.26	1.90	2.18	12.75
Germe	—	1.35	2.22	12.04
Germe	0.30	2.26	2.27	13.53
Germe	0.36	2.67	2.08	14.58
LOWER NORTH-EAST.				
Germe	0.05	0.96	2.01	8.88
Germe	—	1.61	1.81	8.54
Germe	0.07	0.70	2.02	8.67
Germe	—	1.39	1.86	8.31
Germe	0.12	1.23	2.16	9.98
LOWER NORTH.				
Germe	0.69	3.35	1.99	13.55
Germe	0.45	2.96	1.81	14.29
Germe	0.79	2.50	1.84	15.78
Germe	0.41	5.71	2.26	18.26
Germe	0.46	3.39	2.26	17.20
Germe	0.60	3.88	2.20	17.89
Germe	0.79	4.99	2.14	18.09
Germe	0.71	4.86	2.03	16.29
Germe	0.72	5.24	2.00	15.95
Germe	0.51	4.72	2.25	18.55
Germe	0.51	3.11	2.06	16.37
Germe	0.41	2.75	1.98	16.94
LOWER NORTH—continued.				
Spalding	0.65	4.14	2.26	20.27
Gulnare	0.65	4.90	2.15	19.36
Yacka	0.48	3.88	1.76	15.48
Koolunga	0.51	3.19	1.98	15.89
Snowtown	0.63	2.76	1.90	16.07
Brinkworth	0.48	3.02	1.96	16.30
Blyth	0.52	4.68	2.07	17.03
Clare	0.63	5.28	2.72	24.68
Mintaro	0.60	4.13	2.34	23.57
Watervale	0.73	5.00	2.86	27.54
Auburn	0.71	4.48	2.97	24.35
Hoyleton	0.58	3.46	2.03	17.91
Balaklava	0.89	3.36	2.05	15.95
Port Wakefield	1.08	4.08	2.21	13.28
Terowie	0.52	2.04	2.24	13.82
Yarcowie	0.26	1.87	2.29	14.22
Hallett	0.69	3.61	2.01	16.49
Mount Bryan	0.66	4.49	2.04	16.81
Koorunga	0.58	3.96	2.33	18.09
Farrell's Flat	0.40	3.99	2.18	19.00
WEST OF MURRAY RANGE.				
Manoora	0.59	3.71	2.09	18.02
Saddleworth	0.50	3.64	2.16	19.78
Marrabel	0.52	3.61	2.22	19.78
Riverton	0.67	3.66	2.53	20.79
Tadlee	0.96	3.60	2.26	17.93
Stockport	0.96	3.29	2.19	16.63
Hamley Bridge	1.05	4.51	2.25	16.59
Kapunda	0.88	4.25	2.66	19.89
Freeling	1.13	3.47	2.33	17.99
Greenock	1.07	3.71	2.51	21.68
Truro	0.81	3.58	2.45	20.20
Stockwell	0.63	3.78	2.41	20.32
Nuriootpa	1.10	3.28	2.45	21.00
Angaston	0.94	3.63	2.58	22.53
Tanunda	0.90	3.77	2.62	22.24
Lyndoch	1.35	4.14	2.33	22.93
Williamstown	1.29	3.51	2.40	27.48
ADELAIDE PLAINS.				
Mallala	1.50	3.75	2.41	16.72
Roseworthy	1.29	3.73	2.16	17.35
Gawler	1.43	4.93	2.37	19.11
Two Wells	1.60	4.25	2.02	15.88
Virginia	1.64	3.71	2.09	17.32
Smithfield	1.52	4.30	2.22	17.24
Salisbury	1.81	4.12	2.35	18.51
North Adelaide	2.41	6.65	2.64	22.37
Adelaide	2.07	5.42	2.41	21.08
Glenelg	1.77	4.23	2.31	18.45
Brighton	1.93	4.63	2.63	21.37
Mitcham	2.07	5.16	2.54	24.26
Glen Osmond	1.93	4.61	2.69	25.94
Mazill	2.01	6.03	2.86	25.35

RAINFALL—continued.

Station.	For March, 1924.	To end March, 1924.	Average To end March, 1924.	Average Annual Rainfall	Station.	For March, 1924.	To end March, 1924.	Average To end March, 1924.	Average Annual Rainfall
MOUNT LOFTY RANGES.					WEST OF SPENCER'S GULF—continued.				
Teatree Gully.....	1.73	5.67	3.08	27.77	Talia	0.76	1.60	1.33	12.7
Stirling West	2.62	9.37	4.53	46.82	Port Elliston	0.88	1.84	1.50	34.4
Uraidla	2.05	7.85	4.39	44.23	Cummins	0.40	1.19	1.25	35.4
Clarendon	2.48	6.15	3.62	33.09	Port Lincoln	0.48	1.74	1.25	35.4
Morphett Vale	2.74	6.01	2.68	22.90	Tumby	0.20	0.71	1.51	14.4
Noarlunga	2.68	6.33	2.31	20.41	Carrow	0.24	0.77	1.56	14.4
Willunga	2.45	6.43	2.78	25.99	Arno Bay	0.24	1.40	1.34	12.4
Aldinga	1.61	4.71	2.41	20.44	Cowell	0.44	1.65	1.40	12.4
Myponga	1.82	6.70	2.85	29.80	Minnipa	0.29	2.23	2.59	12.4
Normanville	1.50	5.13	2.17	30.70					
Yankalilla	1.61	5.34	2.62	23.31	YORKE PENINSULA.				
Mount Pleasant	1.26	3.07	2.82	27.28	Walleroo	1.15	3.04	1.88	14.4
Birdwood	1.49	3.40	2.98	29.39	Kadina	0.90	2.70	1.49	14.4
Gumeracha	1.77	5.04	3.25	33.36	Moonta	1.14	3.43	1.42	15.4
Millbrook Reservoir	1.85	6.29	3.41	36.21	Green's Plains	1.01	2.83	1.73	15.4
Tweedvale	2.17	5.48	3.18	35.65	Maitland	1.36	3.35	2.09	25.4
Woodside	1.72	4.93	3.16	32.20	Ardrossan	0.91	3.19	1.76	14.4
Ambleside	2.05	6.22	3.39	34.82	Port Victoria	0.79	3.31	1.66	14.4
Nairne	1.68	4.82	3.26	28.44	Curramulka	1.01	3.73	2.65	15.4
Mount Barker	1.83	5.20	3.38	31.30	Minlaton	0.45	2.86	1.46	14.4
Echunga	2.18	5.61	3.46	33.06	Brentwood	0.62	3.28	1.76	14.4
Macleodfield	1.94	4.93	3.24	30.65	Stansbury	0.71	2.84	1.40	14.4
Meadows	2.99	8.18	3.77	36.19	Warooka	0.66	2.87	1.49	14.4
Strathalbyn	1.87	4.61	2.50	19.36	Yorktown	1.35	3.27	1.72	14.4
					Edithburgh	0.76	3.35	1.40	14.4
MURRAY FLATS AND VALLEY.					SOUTH AND SOUTH-EAST.				
Meningie	2.72	5.41	2.34	18.74	Cape Borda	0.96	3.04	2.07	24.4
Milang	1.78	3.81	2.05	15.45	Kingscote	0.49	1.80	1.84	14.4
Langhorne's Creek	1.78	3.86	2.01	14.77	Penneshaw	0.29	1.80	2.07	14.4
Wellington	2.13	3.89	2.20	14.80	Victor Harbor	1.43	3.51	2.50	24.4
Tailm Bend	1.93	4.16	2.36	14.68	Port Elliot	1.33	3.51	2.43	24.4
Murray Bridge	1.27	3.18	2.14	13.94	Goolwa	1.08	3.60	2.55	24.4
Callington	1.42	3.29	2.18	15.49	Pinnaroo	1.19	2.98	2.44	14.4
Mannum	1.27	2.70	1.89	11.66	Parilla	0.86	2.72	1.79	14.4
Palmer	0.81	1.69	2.20	15.46	Lameroo	1.59	4.48	2.08	14.4
Sedan	0.58	2.10	1.84	12.27	Parrakie	1.22	3.30	1.96	14.4
Swan Reach	1.06	2.58	2.00	11.06	Geranium	1.48	3.81	2.40	14.4
Blanchetown	0.91	2.34	1.85	10.09	Peake	2.27	4.69	2.58	14.4
Eudunda	0.46	2.54	2.23	17.51	Cooke's Plains	2.40	4.90	2.67	14.4
Sutherlands	0.84	2.47	1.60	11.20	Coomandook	2.43	4.92	2.14	14.4
Morgan	0.73	2.54	1.51	9.30	Coonalpyn	2.37	5.39	2.06	14.4
Walkerie	0.61	3.32	1.84	9.87	Tintinara	2.21	4.92	2.09	14.4
Overland Corner	1.17	2.50	2.01	11.03	Keith	1.65	4.57	2.15	14.4
Loxton	0.86	3.02	2.78	12.50	Bordertown	1.99	5.60	2.43	14.4
Renmark	0.75	2.49	2.06	11.06	Wolsley	1.35	5.15	1.47	14.4
Monash	1.08	2.78	—	—	Frances	1.21	4.44	2.31	14.4
					Naracoorte	2.40	5.96	2.53	24.4
WEST OF SPENCER'S GULF.					Penola	2.13	5.01	3.09	24.4
Eucla	0.56	1.18	2.03	10.01	Lucindale	2.01	6.02	2.31	24.4
White Well	0.91	1.98	1.44	9.20	Kingston	2.27	5.08	2.41	24.4
Fowler's Bay	0.56	1.77	1.38	12.14	Robe	1.62	4.39	2.82	24.4
Penong	0.87	3.31	1.66	12.53	Beachport	1.65	3.87	3.94	24.4
Ceduna	0.34	2.04	1.34	10.25	Millicent	1.79	5.29	3.26	24.4
Smoky Bay	0.34	1.40	1.34	10.98	Kalangadoo	2.78	7.57	3.11	24.4
Petina	0.56	1.68	1.47	12.95	Mount Gambier	1.88	5.91	3.76	24.4
Streaky Bay	0.75	1.61	1.55	18.07					

AGRICULTURAL BUREAU REPORTS.

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Amyton	•	—	19	Goode	•	23	21
Angaston	•	—	—	Green Patch	910	—	19
Appila-Yarrowie	•	—	—	Gumeracha	•	—	19
Arthurton	•	—	—	Halidon	•	—	—
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Belalie North	•	19	17	Ironbank	•	19	17
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Claypan Bore	•	23	21	Longwood	•	—	—
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Collie	915	—	17	Lucindale	•	—	—
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Moonta	910	—	16	Rosedale	909	—	—
Moorak	*	17	15	Roxy Pine	*	—	—
Moorlands	*	—	—	Saddleworth	909	—	—
Moorook	*	—	19	Saddleworth (Women's)	†	15	13
Morchard	†	19	17	Salisbury	*	1	8
Morphett Vale	*	17	22	Salt Creek	*	—	—
Mount Barker	†	16	14	Sandalwood	*	—	—
Mount Bryan	*	—	—	Shoal Bay	*	15	13
Mount Byron East ..	*	—	—	Smoky Bay	*	19	17
Mount Compass	*	—	—	Spalding	*	—	—
Mount Gambier	*	12	10	Stockport	†	16	—
Mount Hope	*	19	17	Streaky Bay	*	—	—
Mount Pleasant	†	—	—	Strathalbyn	*	15	13
Mount Remarkable ..	*	—	—	Talia	915	14	12
Mount Schank	*	22	13	Tantanoola	928	19	17
Mundalla	*	16	14	Taplan	*	15	13
Murray Bridge	916	—	—	Tarcowie	†	15	13
Myponga	†	16	14	Tarlee	*	—	—
Myrta	916	19	17	Tatiara	†	19	17
Nantawarra	†	17	15	Tweedvale	*	24	15
Naracoorte	†	12	10	Two Wells	*	—	—
Narridy	*	19	17	Uraidla & Summertown	*	7	5
Narrung	*	19	17	Veitch	*	—	—
Neeta	*	—	—	Virginia	*	—	—
Nelahaby	905	19	17	Walkerie	*	—	—
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North Booborowie ..	*	15	13	Warcovie	†	—	11
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Parrakie	*	—	—	Willowie	*	16	14
Paruna	*	—	—	Wilmington	*	16	14
Paskeville	*	—	16	Windsor	*	—	—
Pata	*	—	—	Winkie	*	—	—
Penola	927	5	3	Wirrabara	†	—	—
Petina	†	26	24	Wirrega	*	—	—
Pinnaroo	*	19	10	Wirrilla	*	19	14
Pompoote	*	9	14	Wirrulla	912	—	—
Poochera	912	5	10	Wolawa	*	—	—
Port Broughton	*	—	16	Wookata	914	—	—
Port Elliot	926	16	21	Wudinna	*	—	—
Port Germeln	*	26	24	Wynarka	916	—	—
Pygery	†	19	17	Yacka	*	15	13
Ramco	*	—	19	Yadnarie	*	15	13
Rapid Bay	†	5	3	Yallunda Flat	*	—	—
Redhill	906	—	—	Yaninee	*	—	—
Rendelsham	*	16	14	Yeelanna	*	19	17
Renmark	*	17	15	Yongala Vale	*	—	—
Riverton	*	—	—	Yorktown	*	—	—
Riverton (Women's) ..	*	—	—	Younghusband	916	17	22

* No report received during the month of March.

† Held over until next month.

‡ Formal.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

February 21st.—Present: nine members and six visitors.

FEEDING AND BEARING PIGS.—A paper dealing with this subject was read from the *Journal of Agriculture*, and in the discussion that followed Mr. B. Murphy said that if the farmer kept a good line of pigs and treated them properly they could be turned to profitable account. He favored weaning the pigs when they were about six weeks old. When the pigs reached the age of six months they should be in prime condition for killing for bacon. In curing the bacon he used a mixture of one part of sugar to two parts of salt and a small quantity of salt petre. Mr. J. O'Connor considered the Tamworth an excellent breed of pigs for the bacon trade, because they were good "doers" and the skin was not tough.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

NELSHABY.

October 21st.—Present: 13 members.

WINTER FORAGE OR CATCH CROPS.—In the course of a paper dealing with this subject Mr. L. C. Roberts said larger areas could be devoted to winter forage or catch crops, with benefit to the stock and profit to the owners. By sowing portion of the stubble ground for feed early in the season a larger quantity of first-class feed per acre could be obtained. It would also enable the farmer to top up surplus stock and weaner lambs a little earlier than the bulk of stock that were fed on natural pastures, and so obtain the best prices in the market, which was usually bare of fat stock early in the winter. Sown pastures would carry considerably more stock than natural pastures, and as a consequence, it would take a smaller area of land to maintain the farm stock. In addition to that, a larger proportion of the farm could be devoted to wheat and fallow. The forage crops should be sown early, in order not to interfere with the main crop of wheat. Crops sown for stock should receive the same quantity of manure as that used for the main crops. His experience had been that there was no fodder to equal the six-row barley of the Cape type. If more were sown than was required for green feed, the stock could be kept off the crop from about September, and it would usually give a good yield of grain, which could be profitably utilised for most farm stock. Rye was good for very early feed, but the seed was difficult to obtain. Oats were also good for late feed, and after most of the natural pastures were dry and barley past its prime, the oat crop would be at its best. It was

an excellent stock-fattening crop. If not wanted as green feed, oats made excellent hay, and the grain could with advantage be added to the food of the horses, and it was equal to bran for feeding to milking cows. An oat crop tended to starve out take-all and thus improved the soil for wheat. Rape was a good crop for sheep and dry cattle, but it was necessary to have small paddocks so that the stock could be enclosed on the crop until they became accustomed to it. Experiments should be conducted with peas in the Nelshaby district for fodder. If a portion of the fallow were sown with peas they would prove profitable. They enriched the land to such an extent that many farmers held the opinion that land that had carried a crop of peas in the previous season was equal to fallow for wheat-growing. In the discussion that followed, Mr. F. Jones stated that barley had given him best results for an early fodder crop. Peas also did very well, but he had found that the stock did not take to them too readily. Peas were an excellent crop for enriching the soil.

PREPARING STUBBLE LAND FOR SEEDING.—At a further meeting held on January 19th the following paper was read by Mr. T. D. Haines:—“As early as possible after harvest the stubble should be burnt. If it is not thick enough to carry a fire, use a fire-rake or fire-harrows. The land should then be worked with a share cultivator to a depth of not less than 5 in. I prefer the share to the disc cultivator, because the former leaves the rubbish on the surface. If the stubble is turned in it tends to encourage the development of take-all, and another objection is, that at seeding-time the straw blocks the combine. If rain falls early, work the land a second time before seeding. Should summer weeds make too rank a growth for a spring-tooth cultivator, a disc implement can be used. It is advisable to rake the rubbish and burn it in the hot weather if possible, because if it is left until seeding time it becomes wet, is difficult to burn, and causes a lot of trouble and delay. In the discussion that followed, Mr. P. Noble stated that where the land was inclined to drift it was a debatable point as to whether it was advisable to burn the stubble. He suggested sowing oats on land that showed evidence of take-all. Mr. Haines, in reply to a question, stated that Florence had given the best results of all the varieties of wheat he had sown on stubble land.

WHYTE-YARCOWIE (Average annual rainfall, 13.9 in.).

February 23rd.—Present: five members.

HARVEST REPORTS.—Mr. E. J. Pearce, in relating his experiences during the 1923-24 harvest, said too much rain had fallen during the year to enable farmers to obtain the best results, and the crops on the best land seemed too soft to stand any hardship. The best wheat on his farm was Federation, the next Major, and then Florence and Currawa about equal. He noticed a fair amount of take-all, especially on loose land. Flag smut was also prevalent, and one piece of wheat had a fair amount of ball smut, although all the seed was treated with the same strength of pickle. Mr. J. Walsh reported that crops were looking particularly well up to November, when black rust appeared and did much harm, especially to Federation and Major. Federation and Major gave the best yields, followed by King's White. Mr. G. McGregor reported that crops generally did not come up to expectations. His crops suffered a good deal from frost. One paddock carried a fair amount of ball smut, although the seed sown was pickled and quite free from smut. Mr. S. Robinson stated that in two paddocks that he had sown the seed received similar treatment. One paddock was very badly affected with ball smut and the other was practically free. He also had a good deal of flag smut. Mr. T. Keatley said flag smut was in evidence in his crops. The crops came up splendidly, but went back about the time hay cutting was commenced, and within a short time there were patches of land several yards in extent that were absolutely devoid of crop.

BEDHILL, February 26th.—Thirteen members and visitors attended the meeting, when points of interest bearing on the 1923-24 harvest were brought before the meeting, and an interesting discussion ensued.

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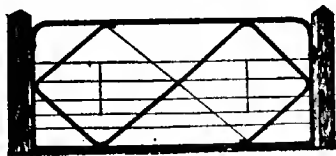


Fig. 201.—Cyclone "Z" Gate.

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LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

WILLIAMSTOWN.

December 21st.—Present: 18 members.

BUILDING.—Mr. A. Bain read the following paper:—"The man who undertakes building a house should first give consideration to the selection of the site. It is necessary to place the house upon a spot that is well drained, because nothing is more detrimental to a structure than to have water continuously seeping under the foundations. The next point is to test the nature of the soil upon which the building is to be placed. Should the surface be loose or defective in any way, it would be advisable to cut a trench the full width of the wall, until solid ground is reached. This trench should be filled in with good concrete, consisting of about seven parts of good sharp sand and rubble to one part of cement, reinforced with $\frac{1}{2}$ in. rods placed close to the bottom of the trench. Lime concrete may be used instead of the cement. In some cases the building site may prove to be firm and solid, and it will not be necessary to use concrete in the foundation. Where this obtains, the foundation can be built with ordinary masonwork. Care should be taken in levelling the top of the foundation, in order to form an even surface to take the floor-plates. When the foundations are completed, they should be covered with a damp course, consisting of heated sand and tar, thoroughly mixed and placed on the wall to a thickness of about $\frac{1}{2}$ in. to prevent moisture creeping up the walls. All masonwork should be laid down in courses, bedded in good mortar and well hammered down, and, if possible, 'throughers' should be used, at least one to every yard of masonwork. All door frames should be carefully set, true and level, with the top of the sill about 7 in. above plate level. The sills should only bear on each end in order to prevent buckling. If brick quins are used, all bricks should be thoroughly wetted before being used, because mortar will not adhere to a dry brick. All brickwork should be struck as the work rises, unless the openings are to be cement rendered, when all the joints should be raked out to give a key for the cement. All masonwork should be flushed on the inside and the joints raked out on the outside ready for pointing. If board floors are to be used, ventilators should be built in on the plate levels, to allow a free passage of air to circulate under the floors. All frames should be securely strapped with hoop iron nailed to the frame and built into the wall, to prevent the frames working loose. Lintels should be formed over all openings, and should consist of cement concrete run into moulds and reinforced with $\frac{1}{2}$ in. rods. If brick arches are used, they should be set in cement compo. Should the foundations prove to be faulty it is advisable to run a reinforced cement band around the building over the top of all openings. This considerably adds to the strength of the building and the common practice of bolting a house afterwards is avoided. When within about 18 in. of the top of the walls, hoop iron or wire ties should be built in to secure the roof, and the top of the wall should be carefully levelled to take the wall-plate. When the walls are completed, pointing can be carried on. Mortar for pointing should be mixed thoroughly from sand that has been screened, and fresh burnt lime, and should be left to temper at least 12 hours before being used. Pointing must be well bagged off, and if it is to be lined, it should be jointed before the mortar becomes dry. All window-sills should have a cement finish and at least a $\frac{1}{2}$ in. weathering to prevent water driving under the sills. If concrete floors are to be used, it is advisable to have all filling done as soon as possible so that it may settle down before the floors are laid down. It is most important that the filling be firm and solid and well soaked with water, otherwise the floor will not be a success. Floors may consist of a good lime concrete laid down to a thickness of about 3 in. After the concrete has been rammed down, it can be finished off with a cement compo finish. The better plan, however, is to lay the floor with a good cement concrete, and when still soft work on a smooth surface by dusting with dry cement well trowelled into the concrete. This forms the floor into one solid block, and the danger of the top surface leaving the bottom is thus avoided. This trouble sometimes arises when lime concrete is used with a cement finish."

LYNDOCH, January 17th.—Mr. J. R. Harris (Orchard Instructor and Inspector for Lower North Districts) attended the meeting and delivered an address, "Orchard and Vineyard Fertilizers." Mr. A. Springbett tabled a sheaf of Sudan grass. The crop was sown on October 23rd, 1923, and when cut on January 16th was 7ft. high.

A further meeting was held on February 21st, when an address, "The Business of Farming," was given by the Manager of the Turretfield Demonstration Farm (Mr. F. E. Waddy).

ROSEDALE, February 20th.—This being the first meeting for the year 1924, the Hon. Sec. (Mr. F. H. Wolf) presented the annual report and balance-sheet, and the officers were elected for the ensuing term.

SADDLEWORTH, March 22nd.—An interesting discussion arose from the reading of an article in the *Journal of Agriculture*, "Subterranean Clover."

The question, "Noxious Weeds," was also introduced for the consideration of members.

WILLIAMSTOWN, March 14th.—Mr. A. Springbett contributed a paper, "The Pruning and Cultivation of the Vine," and an interesting discussion followed.

WILLIAMSTOWN WOMEN'S, March 5th.—The Hon. Secretary (Mrs. G. Hammett) read a paper, "Butter Making," that had been contributed by Mrs. Garrett, of the Saddleworth Women's Branch. Mrs. Filsell tabled a sample of vinegar that had been made from Doradilla grapes.

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YORKE PENINSULA DISTRICT

(TO BUTE.)

MOONTA (Average annual rainfall, 15.22in.).

February 23rd.—Present: 12 members.

THE COMBINED DRILL AND CULTIVATOR.—Mr. N. McCauley read a paper dealing with this subject, in the course of which he detailed his experiences with the implement. He considered it a great labor saver and the best implement for seeding when soil and weather conditions were favorable. In the discussion that followed, Mr. W. Edge favored the combined drill and cultivator because the wheat made an early start and was able to grow ahead of the weeds. Mr. J. Kitto preferred the combine, but found that the land should be kept very clean because the rubbish was a great trouble so far as the combine was concerned. Mr. R. C. Kitto thought the combine was a good implement for killing weeds. Mr. A. B. Ferguson stated that the combine was a labor-saving machine. The crops came up more regularly, it was not necessary to use harrows behind the implement, and the crop was more evenly sown.

WESTERN DISTRICT.

GREEN PATCH (Average annual rainfall, 26.56in.).

February 18th.—Present: seven members and two visitors.

HOREHOUND AS A NOXIOUS WEED.—In the course of a short paper dealing with this subject, Mr. E. M. Sage said in 1910 there were two patches of horehound on limestone sheoak land, some on the arable land, and some on an adjoining piece of stony land on his property. When clearing up the dead timber for ploughing he grubbed all the plants, and burnt them with the timber. The land was cropped in 1910 and 1911, and left out until 1915, when the weed had again become fairly well established. He again grubbed out the plants and burnt them, but a good crop of seedlings again made an appearance. When the land was cropped in 1919 the plants were not so strong as before, so he relied upon the plough to destroy them; but even where the plough turned them upside down they grew again. Seeing that the plants were spreading again during last year, he again grubbed out the weeds and destroyed them, but at the present time the seedlings were thicker and covered a larger area than ever, so that while horehound might be kept under control on land that was cropped fairly often, he considered that on grazing land it would possibly become a noxious weed, especially in districts with a good rainfall. The meeting being held at Mr. Sage's homestead, an opportunity was taken of inspecting the orchard and fodder plots. Afternoon tea was provided by Mrs. Sage.

LAKE WANGARY.

February 24th.—Present: six members and visitors.

COWS ON THE FARM.—In the course of a paper dealing with this subject, Mr. Hull said the farmer should endeavor to obtain the best animals with the means at his disposal, and they would then show a profit for the time spent on them. The number of cows kept on the farm depended wholly on the labor available for milking and attending to the cattle, and where there were large families, good cows were a profitable sideline. When a heifer was to be broken in she should be handled very carefully, and at all times treated with kindness. He did not consider the bail of much practical value, because it was a trouble to keep clean and dry in wet weather, especially where a number of cows were kept. The speaker deprecated the use of the leg-rop because it often made a cow kick that would not otherwise do so. Instead of using the bail, Mr. Hull suggested that the cow should be quietly caught and about 6ft. of chain fastened to her horns, and for a few times she could be tied to a post in the yard. An attempt should be made to avoid tying the animal in the same place twice in succession. Afterwards, one foot of the person milking the cow could be placed on the chain, and very soon the cow would stand anywhere and the chain could then be taken off. If a



Exhibit Staged at the Tanania Show by the Lone Pine Branch of the Agricultural Bureau.

cow was inclined to kick, a piece of rope or cord could be passed over the back and around the body in front of the udder, and a knot tied on the top of her back. Sore teats could be treated with vaseline or lard. For cowpox, it suggested bathing the teats in a solution of Condy's crystals and water before milking, and afterwards applying a dressing of lard or vaseline. The affected cows should always be milked last. Should a cow be hard to milk, bathing the udder and teats in very hot water before milking would sometimes make a difference. If maximum yields were expected from the cows they should be well fed throughout the year. If cattle were bred on the farm he strongly advised keeping to one breed. Should the farmer be in any doubt as to a cow's health, and a veterinary surgeon could not make an inspection, it was better to fatten her for the butcher, rather than keep on milking her, because many diseases were carried in milk and cream. Four of the main evils that should be avoided in the cowyard were the bad-tempered milkmaid, the bail, the leg-rope, and the bad ewe.

POOCHERA.

February 2nd.—Present: 17 members and 16 visitors.

FALLOWING.—Mr. W. A. Gosling, who read a paper dealing with this subject, said the first work in connection with fallowing was that of burning the grass or stubble. After that had been done the land should be ploughed to a depth of about 4 in. early in June, and after rain had fallen the cultivator should be worked at a depth of from 1½ in. to 2 in. to destroy any weeds that had been missed by the plough. During March the harrows should be run over the land that was to be fallowed to ensure a good germination of weed seeds. Immediately the cultivator had finished working the fallow the harrows should be brought into use to make a fine surface soil. The land should be worked with the harrows at least once more before harvest, and if a good rain fell the cultivator should be used. Subsequent working of the land would depend on the growth of weeds and the amount of rain received. If the land were cultivated during February or March, the fallow would then be in excellent condition for seeding operations, which work, he thought, was best done with a combine after the first winter rains. For working the land he favored a spring tynes cultivator in preference to the bridle or draught implement, because the former made a thorough job of pulverising the soil. He then quoted the method of preparing the seed bed as recommended by the Superintendent of Experimental Work (Mr. W. J. Spafford) in the Departmental bulletin "Tillage of the Soil." Mr. Gosling then referred to the difficulty farmers had in that district of dealing with the plant locally known as "buck bush." As a rule that plant made its appearance on the land during December, a time when most of the farmers were engaged at harvesting and could not get out to work on the fallows. If time could be spared, the buck bush could be fairly easily dealt with at that time, but if left until later on in the season it entailed a good deal of work to clear the land of the bushes. In the discussion that followed, Mr. M. Prowett thought cultivating should not be commenced until September. The general opinion of members was that cultivation was governed by the amount of rain and the growth of weeds. Mr. V. Newbon thought ploughing to a depth of 2½ in. would give best results in the Poochera district. Mr. S. Joy thought that where the farmer had to deal with light sandy soils it was advisable to plough in the stubble or grass rather than burn it off, so that the straw, &c., might assist in preventing the land from drifting.

WIRULLA.

October 20th.—Present: 20 members.

The report of the delegates to the Annual Congress (Messrs. H. and F. A. Doley) was received and discussed.

On October 29th and 30th the Manager of the Minnipa Experimental Farm (Mr. Rowland Hill) visited the district for the purpose of judging the crops entered in the wheat-growing competition conducted under the auspices of the local Branch of the Agricultural Bureau. Thirteen crops entered the competition, the result being:—First, Mr. F. A. Doley, Late Gluyas, 85 points; second,

Mr. J. M. Souter, Late Ghuyas, 79 points; third, Mr. F. A. Doley, Queen Emma, 78 points. On the evening of the 30th Mr. Hill delivered an address to a large audience, including a number of lady visitors.

UNDERGROUND TANKS.—Mr. F. A. Doley, who has resided on the West Coast for nearly 16 years, after having spent several years in the Adelaide hills, in the course of a paper headed "My Experiences with Underground Tanks and Method now Adopted in Construction, and Reason for Same," which he read at the November meeting, said during the winter of 1918 he obtained advice on the construction of the sloping side concrete tank, and the information that he gained had since stood him in good stead. At that time he saw a "slap-up" tank under construction; the tank was about 15,000galls. capacity, it was scooped out, and had trimmed-off sides with a batter of about 2ft. in two, and was taken down to a depth of nearly 6ft. The lower layer of soil was of a sandy nature, with very little rubble in it, which was simply wetted, mixed, put on the side with a shovel, patted down, and then cemented over and taired. At the present time the tank was full, and the only time it had been repaired was when the roof fell in and knocked a hole in it. He was fully convinced that with a little better mixture for the concrete such a tank would be most serviceable for the Wirrulla district. Other farmers who had seen the same proof and heard the same advice still pinned their faith to the mason-work tank, and in almost every instance that class of tank had given trouble. In 1910 he started farming in the Hundred of Petina, and on the block that he took up a 20,000galls. mason-work tank had been built. The first thunder shower that came filled it, and it emptied nearly as quickly, and although it had been repaired, no more rain had fallen to run water. To put in the seed for the seedling of 1910 was the hardest and roughest experience it had been his lot to face on the West Coast, for every drop of water that was available had to be carted a distance of about eight miles. During the latter part of the winter he had his first experience of working at one of those tanks, one of about 15,000galls. capacity. The following year, 1911, another tank of 17,000galls. capacity was built on the same property. The next year, 1912, another selection in the Hundred of Guthrie was taken up, and a tank of 30,000galls. capacity and nearly 7ft. deep was prepared. All the tanks were constructed on about the same lines. They were scooped out, with a good batter, lime was burnt and each tank was constructed with the rubble that was scooped out, about seven or eight parts of rubble to one of slaked lime being mixed and used. That was put on from 4in. to 6in. thick, and then two coats of cement were applied, one of about four to one and the last coat two to one. That was turned over, and in every instance the tanks had held and had given no trouble. The following year in the Hundred of Petina he set out to put down a 10,000galls. or 12,000galls. tank. On that occasion very heavy sinking was encountered, and owing to the lack of explosives, and the fact that harvest-time was approaching, a halt had to be called, and a tank of 7,000galls. or 8,000galls. was made. The tank was constructed in the same manner as the others, and with the same pleasing results. The following year, 1914, no tank was put down, but surplus horses were run on the place and so water had to be obtained from the railways until rain fell. After serving abroad with the A.I.F., he came back to the West Coast fully convinced that even without the Tod River scheme the water difficulty could be overcome. In February and March of 1920, on section 7, Hundred of Wallpuppie, he constructed a 20,000galls. tank of lime and concrete, with two coats of cement, and tar being unprocureable, the tank was washed with cement after the first coat of cement was applied, and the same results were obtained. The tank never leaked, and it had been full several times. In the same year he put another tank down on his selection. The tank was of 20,000galls. capacity, and was finished off with cement wash. During July, 1920, another 12,000galls. tank was completed, being finished off with two coats of cement and a cement wash; no tar was used. Each tank was done with lime concrete, about the same strength as before. Cement wash was used instead of tar, and each one had been overflowing on several occasions, and not any of the tanks had shown any sign of leaking. The following year, 1922, he put down two more tanks, including one of 13,000galls. These were built with cement concrete, two coats of cement, and cement washed. The 13,000galls. tank was finished and had been overflowing

and was watertight. During the winter of 1923 he finished off a 12,000-gall. tank and had put down two more, one of 15,000galls. and the other just under 20,000galls. The mixture used was 20 parts of rubble, just as it came out of the ground, and one of cement. The mixture set and made a good solid background and he felt sure was superior in strength to the lime mixture previously used. For the 12,000galls. tank a little over six small bags of cement were used. One fair-sized limekiln provided sufficient lime to do the two 20,000galls. tanks. Five bags of cement were used on the first tank of about 13,000galls. capacity; valued at 11s. per bag, that would mean a cost of under £8. For the tank completed during the past year, one of over 15,000galls. capacity, he used about 1 ton of cement, which cost about £9 10s. delivered. The tank, which held just under 20,000galls., required 23 small bags of cement, which cost approximately £22, so that the cost of material in all cases would be about the same, 13s. to 14s. per thousand gallons. The figures quoted were exclusive of labor. For practically all of the tanks the sinking had been similar, and a layer of rubble had been encountered which provided the mixing material. On no occasion had he been able to get down to the full depth without striking soil or rock that was too tough to excavate, so that in all cases the tanks were scooped out with a slope of 1ft. in every 2ft. or thereabouts, and enough rubble left in the bottom on which to build the tank. The mixture was prepared at the tank, put on with a shovel and cemented over, generally with the two coats of cement of five to one for the first coat and five to two for the second coat; finally a cement wash was applied. It was his ambition to provide for horses and a few cattle a storage capacity of about 100,000galls. or a little over. Concluding, Mr. Doley said:—"In summing up, after an experience in this part of the State for 15 years, I am fully convinced that the matter of water storage can be overcome, and if everyone buckled to and put down tanks there would not be the sickening sight of last year, when nearly all hands were busy getting water by the train. One man in the district who only settled in 1916 never rested contented until he had a storage of 100,000galls. on his farm, and last year, when everybody else was rushing the train, he was able to oblige some of his neighbors with water and then had seven thousand gallons on hand when rain came. To overcome the water difficulty, it is essential that we all put down more tanks, and from my experience I strongly advocate the building of the sloping-side tank. Anybody who is not frightened of a little hard work, and uses a little care, I am sure will have satisfactory results. The main point in the construction is, never make up the background for concreting; if a big stone is removed or a hole should happen to be made, do not level it off with the earth, but leave the hole and fill it in with the concrete; build up a 6in. or 9in. coping around the top and pack it well with soil so the water cannot get in behind, then, when it is cemented, cover it with brush or hay as soon as possible, and there is no doubt you will be amply repaid for your trouble."

WOOKATA.

February 16th.—Present: 10 members and six visitors.

HARVEST REPORTS.—Reports on the 1923-1924 harvest were given by Messrs. H. V. Hobbs and F. Underwood. Mr. Hobbs reported that land that had been ploughed to a depth of 4in. in July, sown with Currawa wheat at the rate of 1bush. to the acre and ½wt. of high-grade super, yielded 7bush. to the acre. Land that had been fallowed and harrowed several times before drilling, and sown with 1bush. of Sultan wheat and ½wt. of high-grade super, and harrowed twice after the drill, yielded between 17bush. and 18bush. to the acre. Mr. Underwood reported that fallow land sown with 1bush. to the acre of Smart's Early wheat and ½wt. of high-grade super yielded 21bush. to the acre. In the discussion that followed, members were of the opinion that land should be fallowed early in order to obtain the best results. Members thought it would be advisable to harrow new land, providing the land was wet; others thought new land should be harrowed before the drill. Mr. Underwood mentioned that he had sown an area of new land and applied super at the rate of one bag to the acre, and the crop which resulted was almost a total failure. The subject, "Smut in Wheat," was brought up for discussion, when members said they had noticed a great reduction in smut by pickling with bluestone.

COLLIE, March 8th.—Mr. A. P. Rowen read a paper "Binderpest," which was responsible for a keen discussion. Mr. Rowen also gave information regarding the destruction of rabbits with fumes from a petrol engine.

TALIA, February 16th.—Mr. C. T. Dolphin read a paper, "Comparison of Costs of Hand and Machine Shearing," and a keen discussion followed. A paper on the same subject was also read from the *Journal of Agriculture*.

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EASTERN DISTRICT.

BARNERA.

January 21st.—Present: 15 members.

Papers dealing with the subject "Sanitation and Prevention of Stomach Disorders" were read by Dr. R. A. Baker and Mr. T. R. Wilkinson.

On February 13th, 22 members in company with a number of lady friends visited the Berri Orchard, and, under the guidance of the Manager (Mr. C. G. Savage) inspected the various horticultural experiments being carried out in the orchard.

Mr. F. H. Levein, of the Berri Branch, attended the meeting and read a paper, "Fruit Drying."

MERRAY BRIDGE, February 19th.—Mr. C. H. Beaumont (Orchard Inspector and Inspector) attended the meeting and delivered an address in which he related some of his experiences during a recent trip to California.

MYRLA, March 15th.—A paper dealing with the subject "Care and Management of Horses" was read by the Hon. Secretary (Mr. C. A. Ziersch). The paper was fully discussed by all members present. It was decided that the next meeting of the Branch should be held during May.

WYNARKA, February 16th.—The February meeting was devoted to a discussion that arose from reports of the 1923-24 harvest. The highest yield, 18 bush. to the acre, was obtained from wheat sown on fallow land. The returns from the hay crops were satisfactory, and several members commented on the benefits that were being obtained by including oats in the crop rotation on the farm.

YOUNGHUSBAND, February 21st.—The meeting took the form of a "By-Parliament." A number of questions of local interest were brought before the meeting, and a keen discussion ensued.

YOUNGHUSBAND, March 20th.—Mr. G. H. Mann read the paper "Tillage of the Soil" that had been contributed at the Annual Congress by the Superintendent of Experimental Work (Mr. W. J. Spafford), and a keen discussion followed.

SOUTH AND HILLS DISTRICT.

BALHANNAH.

February 22nd.—Present: 27 members.

APPLE GROWING.—The following paper was read by Mr. A. R. Pencock:—"It has been proved that the apple tree will grow profitably on a greater variety of soils than any of the other deciduous fruits, for any ground that overlies a strong clay subsoil will produce good crops of apples. The selection of a suitable site for an orchard need not worry the apple grower of today, for, although the best position is facing the rising sun, one can produce good fruit where the ground falls in various other directions. There is, however, a slight disadvantage associated with a southerly slope, on account of the cold winds that sometimes blow from that direction when the fruit is setting, and the again, an orchard with a northerly aspect is liable to encounter dry hot winds when the trees are flowering or when the fruit is setting. Great care should be taken in preparing the ground for planting. All timber, stumps, and weeds should be cleared off to a depth of not less than 18 in. Then the whole of the ground should be subsoil-ploughed to a depth of not less than 12 in., in order to provide ample spreading room for the young tree. On no account should the trees be planted less than 20 ft. apart, and then on good, average country the branches of the trees will in time touch one another. Always have the ground pegged out before planting. At 20 ft. apart, about 100 trees to the acre can be planted. When planting the tree, a hole a little larger than the spread of the roots should be dug, and a small mound of earth formed in the bottom of the

bed. The tree should then be placed on top of the mound, the roots being spread out carefully with a tendency to strike downwards. Any broken roots should be cut off behind the break. After the tree has been placed in position, some fine, loose soil may be filled in and tramped firmly around the tree, after which the rest of the soil should be filled in, care being taken to have the soil around the tree higher than the corresponding earth in order to allow for it settling down, and to carry water away. When the operation is finished, the tree should stand at the same depth as when in the nursery bed. During the first year the ground should be constantly stirred with a scarifier to conserve moisture through the dry summer months and kill weeds. Land treated in this manner assists in giving the tree a good 'kick off' the first year. If this treatment is continued in subsequent years, the trees will make vigorous growth, and soon become large and sturdy. Unless the trees produce strong growth when young, they are apt to become stunted and never make satisfactory orchard trees. It has been proved beyond doubt that the tree grafted on the Northern Spy stock produces the best tree, and that it also is a better bearing tree than those on the Winter Majestic or seedling stock. Both the Northern Spy and the Winter Majestic are immune from Woolly Aphis, but the former throws out very fibrous roots, and is a vigorous grower, whereas the latter has the habit of making long naked roots without fibres. The stock should be worked at least 6in. from the ground, if worked near the surface the scion is apt to throw out roots which will be attacked by Woolly Aphis. Underground draining is always advisable in low-lying land. It removes surplus water in the winter, and helps to sweeten the soil; also the trees are better enabled to resist the attacks of Black Spot. The distance between the drains depends a great deal on the nature and contour of the ground. On ground that has very little fall, it is advisable to put a drain in between each row of trees and the next, no heed being taken of the class of soil on which the trees are planted. On land where a white sandy soil overlies a stiff clay subsoil, it is well to place the drains 20ft. apart, whilst on soils that are fairly open, 40ft. is sufficient. If the drains are placed 40ft. apart, and they do not thoroughly drain the soil, another drain could be placed in between, making them 20ft. apart. All drains should be not less than 2ft. 6in. deep, with the main drains 3ft. deep. On ground that is very wet, 6in. could be added to the above measurements, for the deeper the drains the greater the quantity of water that will be drained from the soil. For ordinary lateral drains, 3in. drainage tiles are large enough, whilst for the main drains, 4in. tiles will suffice. Wooden drains are of little use in the orchard owing to their liability to promote the growth of *Acantharia* in the trees. Stone drains seem to choke more easily than tile drains. It is also a good plan to run a plough furrow through any small dip or hollow, and also across the hillside in a diagonal manner where the land is likely to wash. Pruning is practised in order to increase the vigor of the trees. The operator must have a knowledge of the particular variety with which he is dealing. In pruning the Jonathan the first year, three or four branches should be left well spaced from the stem, so that they will form a well balanced head, these shoots being cut back to within 6in. of the junction with the main stem. The following year these trees will have made fairly good growth. The main shoots or leaders should then be cut back to 12in. or 14in. while the side shoots which have shot out should not be pruned, because these go towards the future fruit-bearing wood. On no account should the ends be cut off, for in that case they would only grow further without producing fruit buds. The following year it will be noticed that the lateral branches that have been left unpruned will have developed a full length of fruit buds. These laterals may now be slightly shortened back, care being taken to cut to a wood bud, and not to a fruit bud. The main branches will have made further growth in regard to lateral branches, and these should be dealt with as in the previous year. Because these form fruit buds, they will require to be shortened back each year, so that in a few years proper fruit spurs will have been formed. When the trees are about five or six years old, the grower can allow another leader to develop from the already existent leaders, and thus form a double ring of leaders as the tree increases in size. A tree that has been pruned in this manner will, in a few years, be well furnished with fruit spurs from the fork of the tree along the main branch, and

also along the laterals. This style of pruning can also be carried out on such varieties as Statesman, Stayman Winesap, Esopus Spitzenberg, and in a lesser degree with the Buncombe and Reinette du Canada, with the exception that the lateral growth should be kept shortened back, because these varieties bear heavily on short spurs, while the leaders of the last named two varieties can stand a harder pruning than the earlier-mentioned sorts. This latter system of pruning, however, can be carried out on most of the sorts grown, particularly the London Pippin, Rokewood, Stone Pippin, and King David. With the Rome Beauty variety, however, a different style is necessary, owing to its habit of producing long, willowy limbs, devoid of fruit buds. From the time this sort is planted, the laterals should be kept cut back, while the leaders should be kept back to not less than 12in. and not over 8in. of fresh growth each year. In this manner it will be found that by the time it comes into bearing, the tree will be well spurred all along the main branches. The Rome Beauty will carry more fruit per tree, for its size, than any other commercial sort grown. On this variety, one should aim at producing a tree with a double ring of leaders, one inner and one outer row. Thus, when the tree starts to crop, the outside leaders will open out and allow the inside fruit plenty of sunlight. Care should be taken to keep the outside fruit spurs shorter than those on the inside of the leaders for there are always some of the buds knocked off when the orchard is being cultivated. This applies to any sort of apple. When the trees have reached bearing age, the grower must exercise great care in pruning. On poor land it is necessary to prune more heavily than on a richer class of soil, and one must be remembered that heavy pruning encourages two of the worst troubles that the apple grower knows, Bitter Pit and Woolly Aphis. On a heavily pruned tree, the sap has less fruit wood to feed, and consequently less fruit, with the result that the fruit is filled with an excess of moisture and grows to an abnormal size, and is of poor quality and affected by Bitter Pit. In regard to Woolly Aphis, the excess of sap that is forced through the tree results in a rank growth of both foliage and wood, the latter of which is easily attacked by the Aphides. It often occurs that after a succession of heavy crops the orchard needs manuring. Of the several which can be recommended, stable manure is by far the best on poorer soils. It is rich in organic matter, and one good coat of this will keep the trees going for years. Where this manure cannot be obtained, potash, mixed with bone super, is the next best, but it should be applied at the rate of 2cwt. to the acre, spread over a period of three years, to enable best results to be obtained. Where the land is lacking in nitrogen, a cover crop of green peas can be ploughed in, and thus enrich the land, but this is hardly necessary in our district owing to the growth of weeds that is ploughed in every year. Lime is also useful, because it helps to sweeten the soil and eradicate sorrel. It should be applied at the rate of 10cwt. to the acre per year for three successive years. At all times the land should be cultivated, for only by this means can the necessary moisture be conserved. It is best to plough at the end of the winter, and so bury all weeds and help to check the early spring growth. Never plough too shallow, because the roots of the tree come to the surface to draw the moisture and a shallow depth of loose soil soon dries up with the summer weather. Care should always be taken to plough to an even depth right through the orchard, and for this purpose I recommend a ploughing of not less than 6in. When ploughing is finished, go over the ground both ways with the harrows. For subsequent cultivations, the spring-tooth cultivator is best to break up the crusty surface, care being taken to scarify the garden in two opposite directions. One of the difficulties which confronts the modern orchardist is the fertilisation necessary for different kinds of commercial apples. The Jonathan requires most care owing to the preponderance of female blossoms in every cluster. One has to take into consideration the climatic conditions. For instance, in a warmer climate the Reinette du Canada will flower earlier than it will in our district. This fact is borne out also on other earlier varieties here when we have a dry winter followed by an early spring. I believe it is best to have each sort placed alongside some other variety that flowers at the same time. As to the Jonathan, for our own district, I cannot recommend a better variety for cross fertilisation than the Rokewood, with Statesman a close second, for where Jonathan trees are alongside the Rokewood an apple of better color is obtained.

and it also has a harder texture, thus helping in its keeping qualities. There are many other varieties which will effectively cross-pollinate the Jonathan; for instance, the two already named, with the Emperor Alexander, Maiden's Blush, Prince Alfred, Sassa and Esopus Spitzenburg. Dunn's Seedling and Cleopatra can also be recommended where they can be grown successfully. With the Jonathan variety it is best to have two rows of the pollinating variety in every four rows of Jonathans. Any of the other earlier flowering sorts yield better crops where they are inter-planted, and such varieties as Stayman Wine sap, Requette du Canada, King David, and William's Favourite can be successfully grown together, whilst the later flowering varieties will produce fairly heavy crops where they are grown in blocks. They will also bear a larger quantity in production, when they are interplanted, this being particularly so with the Bim combe variety, which should be placed in between the Rome Beauty and London Pippin varieties to ensure it setting a full crop. Of the mid-early and later varieties, four rows of each variety are sufficient to ensure cross pollinating. It is advisable always to have a green apple planted in between two colored

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varieties, because it gives the greener apple a reddish tinge. On spraying depends the quality of the fruit grown. When spraying is necessary all other jobs should be placed on one side, for a day's delay in the earlier stages of the fruit is often reflected in the ultimate returns from the trees. One should have the spray pump in use immediately the fruit buds begin to open. For Black Spot and Fusicladium one should commence to spray when the flower clusters are just starting to open—with the centre bud pink—at a strength of 1gall. lime sulphur solution to every 33galls. of water. When one has apples that are inclined to scab badly, such as the Rome Beauty, London Pippin, and Bismarck variety, it is better to spray when the buds are in the green stage, at the strength of 1gall. of lime sulphur to every 25galls. of water. Care should always be taken to wet thoroughly the whole of the fruit clusters, including the stems. Some growers use Bordeaux or Burgundy mixtures for combating Fusicladium. When the petals of the flower have fallen and the calyx of the newly-formed apple is just starting to close, the first spray to check codlin moth should be applied. This is by far the most important spray of those applied to keep the Codlin Moth under control. If it is delayed for only a short period, it gives the codlin moth an opportunity to deposit its eggs in the calyx of the apple. It is advisable to add to every 100galls. of mixture 1lb. of casein to act as a spreader to increase the covering capacity. With the aid of casein, the mixture forms a film-like covering over the surface of the apple. Flour makes a good spreader, but it should be mixed into a thin paste before being poured into the vat. The first arsenate of lead or calyx spray should be composed of 6lbs. of lead to every 100galls. of water, and to this solution from 1gall. to 2galls. of lime sulphur should be added to help keep the fruit free from Fusicladium. This spray should be applied at high pressure and driven well into the calyx of the apple, and thus kill the grubs when they start to chew the fruit. Great care should always be taken to spray up and down the tree: spraying up on the outside of the limbs and down on the inside, in order to ensure a thorough coating of all fruit. For this spray it is best to use the nozzle, while for all previous and all subsequent sprays one can use either the spray pistol or the spray gun, the latter applying only where power plants are used. The second spray to control the Codlin Moth should be applied not later than 21 days after the first application. It is made up of 6lbs. of arsenate of lead to every 100galls. of water. Great care should be exercised to see that the whole surface of the apple is covered, and so kill any stray Codlin grubs that might be about. The third lead spray should be applied not later than 25 days from the date of finishing the previous spray. It should be composed of 6lbs. arsenate of lead with 1lb. of casein. The later maturing varieties should be sprayed about the middle to the end of February to destroy any later hatched grubs. A pest that has given considerable trouble to fruitgrowers of late years is the Woolly Aphis, which, as I have said before, is due mainly to heavy and injudicious pruning. There is, however, ample means of keeping it in control with the spray cart. It has been said that trees which are well opened out to allow the rays of the sun to penetrate right into the centre have very little Aphis, but while this may apply in a warmer climate, I can see very little in its favor, so far as we are concerned. Where trees are badly infested with the insect it certainly pays to let them go unpruned for one season, provided, of course, that they are making rapid growth. Where one has Woolly Aphis very badly, it is advisable to give the trees a spraying of prepared crude oil emulsion at the strength of 4galls. of emulsion to every 100galls. of water about the end of July. This spray will also help to kill any scale pests that might be harbored about the trunks of the trees. These oil sprays, can, however, only be applied when the trees are dormant, and, as the worst visitations of the pest appear during the spring and summer, it is best to add to either the second or third arsenate of lead spray, $\frac{1}{2}$ pint of Black Leaf 40. This preparation kills the Aphides by contact, and is by far the most effective of all the sprays for combating the pest. Where one uses the Black Leaf 40, unaided by any other preparation, it is best to add a spreader to it, and so increase its adhesive powers. After the infested trees have been properly sprayed with this preparation for one season, they will be kept in check from Aphis for many years to come. By far the worst of all pests and diseases which the apple grower has

had to combat in recent years are Thrips. The Thrip must not be confounded with the Bryobia Mite and the Red Spider. A spray that controls the Red Spider and Bryobia Mite will partly control the Thrip, and the addition of 1 pint of Black Leaf 40 to both the green and pink stage sprayings in the earlier part of the season is suggested. Rome Beauty, London Pippin, and Bancombe varieties are often badly attacked by this insect, and as these sorts are subject to Fuseladium it is wise to make the double application to ensure clean fruit, and at the same time help check the Thrip. The bee is probably one of the best friends that the fruitgrower has for pollenising his crop, and it is worthy of note that during the recent two poor apple seasons there were few bees about this district. It is by all means advisable to have the bees in boxes that can be closed up on the days that one is spraying with the different fungicide sprays. Thinning a heavy crop of fruit when necessary is a payable undertaking. If all the fruit that has set is allowed to remain, the crop will be small in size and of little commercial value, whereas if the fruit is thinned; in the case of a heavy crop by at least one-third; the remainder will grow to a much larger size, and be of greater value. Additionally, the trees are likely to carry a more regular crop of good fruit each year, instead of every alternate year. Where the fruit clusters have set heavily it is best to remove all but the centre apple of each cluster, while where the apples are not so thick, two or perhaps three can be left. Even after the thinning has been done, the weight of the remaining apples is so great that unless the main leaders are supported, they will bend over until they touch the ground, and the fruit will be burnt by the rays of the sun striking straight down upon them; whereas had the limbs been propped, the sun would have struck slanting down the limb, and would have colored both the upper and the underneath portions of the apples of the clusters, or in the case of single apples, it would enable the light of the sun to get all around the fruit. Where propping is not done, the limbs either crack or break right off, thereby spoiling the symmetry of the tree which has taken years to build up, besides lessening the carrying capacity of the orchard. It is necessary that we should endeavor to grow only good clean apples for the world's markets."

CYGNET RIVER.

February 19th.—Present: six members and 16 visitors.

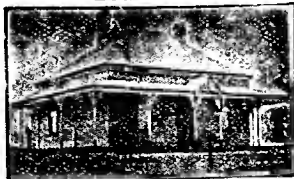
SIDE LINES ON THE FARM.—In the course of a paper dealing with this subject, Mr. H. Cook said on some farms it was necessary to run a side line to make farming a profitable undertaking. Side lines were many and varied, and those that could be adopted differed considerably according to the kind and

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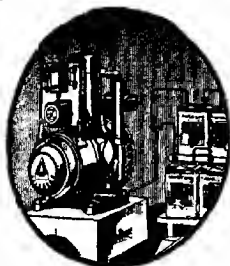
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size of the holding upon which the settler had to work. For the average farmer the best and most profitable side line was, undoubtedly, sheep. For that district he favored the Merino. If the farmer intended breeding sheep, it was most essential that the right class of sheep should be selected. Good ewes were just as important as good rams. If sheep were to be raised for the butcher, it was a debatable point as to which was the best breed, but as a wool producer, or dual purpose sheep, the Merino was to be preferred. Sheep could be used to great advantage for keeping down rubbish on fallow, and often many undesirable weeds and shrubs were completely eradicated through being eaten off by sheep. Sheep also added to the fertility of the soil. He strongly favored hand feeding the animals, especially when the pastures were beginning to get bare. Unless sheep owners were prepared to sacrifice the quality of the flocks, they should not keep crossbreds. If crossbreds were kept, the production of mutton should be the first consideration, and wool a secondary object; with the Merino, however, wool was of first importance. A very noticeable feature of recent years was the marked preference judges had shown for the strong woolled Merino in most of the leading show rings. That point, he thought, should be carefully studied and not carried to extremes, because it was the fine wools that were commanding the highest prices to-day. Dairying under suitable conditions was also a profitable side line. It was perhaps best where the holding was small and the family large. If labor had to be employed, then the bulk of the profits would be expended in wages. It was essential that good cows be kept. It was not so necessary to have heavy milkers as it was to have cows that would produce a large percentage of butterfat. For the farmer, he considered that the Jersey was the most desirable breed, and the Holstein a good second. Summer fodders were a very important factor towards the successful keeping of cows. Foremost amongst these was lucerne, but the crop required a lot of attention and a good supply of water to ensure abundant fodder. Maize, sorghum, Sudan grass, and chon moullier were also good milk producing fodders. With dairying, pig raising should be seriously considered, because, as a general rule, those two operations were most successfully combined. Like most stock, it was very important that a good class of pigs should be secured at the very beginning. Pigs could easily be fattened if proper methods were adopted. He recommended feeding pigs about four times a day, while they were being fattened for market. Poultry was a line that most farmers could hardly do without, and as a side line it could be made a good source of revenue as well as a considerable saving in the upkeep of the house. A good strain of Black Orpingtons was the best breed of fowls for farms on Kangaroo Island where eggs were required, and for table birds, the Black Orpington crossed with English or Indian Game. In isolated districts a flock of turkeys would be a good asset. There should be no reason why the average farmer should have to buy either eggs, bacon, or butter. On larger and well-grassed areas, perhaps raising beef cattle might be considered, because there was always a demand for the right class of good fat cattle. Breeding horses might be considered in much the same light as that of breeding cattle. The market for horses was often unsatisfactory, but there always seemed to be a demand for a good class of heavy farm or team horse. With the price of barley so low as it had been during the past year or two, it made the farmer consider one or other of such side lines in a very serious manner, and unless the market for barley improved, he thought it would be necessary for barley growers to look to something else as a means of income. Hay growing could be carried on, and if there were no local market for hay or chaff, it could be fed to sheep and thereby show a good margin of profit. Too many side lines did not pay, because they could not be given the proper amount of attention which they required. In concluding the paper, he again emphasised the necessity for procuring only the best class of stock for breeding purposes.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

February 18th.—Present: five members.

FARMING AND EUCALYPTUS OIL DISTILLING.—Mr. A. Nicholls, in the course of a paper under this title, said that owing to the shortage of labor for leaf cutting at the time of the year when oilmaking was most profitable, farming and oilmaking



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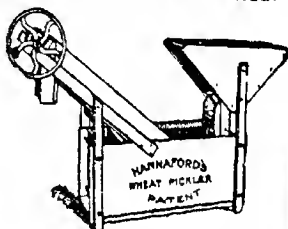
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Barley, Lucerne, Sudan Grass, and other Cereals.

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could not be carried on successfully together. If a landholder on Kangaroo Island were desirous of following agricultural pursuits, no matter whether growing crops or keeping sheep, it was necessary for him to devote all his energy to clearing scrub and working the land. The land had to be fallowed and cultivated after every rain to secure the best results. For eucalyptus oil production an up-to-date still at the present time would cost about £200 to erect, and it was necessary to enter into contracts to dispose of the oil. The oil market was not to be relied on. Sometimes there was a market for oil, but last year oil could not be disposed of at any price. If an unfailing market could be guaranteed at 1s. 6d. per lb. for crude oil, distilleries could make oil during the whole of the year, but at 1s. 3d. per lb. oil distillation was only a payable undertaking for about two months of the year, and those two months were the period when the farmer should be harvesting cereal crops. Oilmaking was a useful standby, in that it provided the grower with ready cash, but there was always the danger of the settler allowing the land, which had costs pounds to clear and sweeten, to grow up to scrub again, and then it was found that there was no sale for oil. He was of the opinion that if there were no eucalyptus leaf or yacca gum on the Island, the Island would show more signs of development. A good deal of the land was poor, but it would all grow feed for stock. The greater portion of the land was sown and required a good deal of working to sweeten it, with not much profit for a few years, but with sheep and cultivation it would grow feed. Much of the ironstone country would grow turnips, rape, mustard, and rye. Land seeded with barley or oats, with 100lbs. of super to the acre, sown for sheep and left out for two years, would provide good grass for grazing. There was no holding in the district that did not contain a piece of land on which the settler could grow hay and a little corn and keep a cow, a few pigs and poultry, and grow his own vegetables, but he could not do that and make oil.

McLAREN FLAT.

December 18th.—Present: 47 members and three visitors.

PHYLLOXERA.—Mr. Wyatt, in the course of a paper dealing with phylloxera, first gave an interesting description of the life history of the insect, and then referred to its appearance in Australia in the following terms:—"In 1877 phylloxera was found in a vineyard at Geelong, Victoria, and all vines growing within a radius of some miles were uprooted. It was found in Bendigo, Victoria, in 1893, and again all vines growing within a certain area were uprooted, and the soil treated with C.S.₂. In 1899 it broke out in Rutherglen district, Victoria, and again certain vineyards were uprooted and treated with C.S.₂. In the same year a general inspection of the vineyards of Victoria revealed the fact that phylloxera existed in six different vineyards in Rutherglen, four in Ardmole, one in Mooropna, and several in Trolamba, Bendigo, Geelong, and Tapscott. All of the wine-growing districts of Victoria except Lilydale and Great Western were found to be infected. Before 1899 the majority of the outbreaks of phylloxera in Victoria were discovered by the individual grower himself, and then only when a certain number of vines were dead or dying. It takes from three to six years, and in some cases more than that, for phylloxera to kill a vine. The yearly treatment of infected vineyards with C.S.₂ is altogether too costly to be carried out commercially. The same may be said of annual submersion, which can only be carried out successfully in certain localities. Grafting on American resistant stocks is the only means left to the grower of dealing with this insect. When phylloxera broke out in Europe and started destroying the vineyards of France, French scientists argued that, since phylloxera only fed on plants of the genus *Vitis*, it would only be a matter of time before all vineyards and vines would be destroyed, thus unless the parasite changed its food it must die out too. It would be committing race suicide by killing its host plant, and destroying its supply of food. They contended that there must be a *Vitis* somewhere able to withstand the ravages of the insect. On investigation they found that the wild vines of America resisted the attacks of the insect. Natural selection had evidently taken place, and only those vines that could withstand the attacks of the insect were growing and the insect living on them. It was also found that, unlike the European vine (*Vitis vinifera*), the American vines belonged to many distinct botanical species, each with numbers of varieties and endowed with distinct properties, and each growing in a different soil and climate."

April 15, 1912

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AGRICULTURAL PUBLICATIONS.

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AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

ROCKWOOD.

February 16th.—Present: seven members.

FRUIT DRYING.—In the course of a paper under the title, "Sun Dried Fruits," Mr. L. Heath first made a reference to the amount of fresh fruit that was wasted, but which, with very little trouble and expense, could be dried and turned into a palatable and nutritious form of diet. The speaker mentioned apples, pears, peaches, plums, &c., as varieties of fruit that could be easily dried, and in treating grapes he suggested that the bunches should be dipped in a weak solution of washing soda, then hung on strings in an iron-roofed shed. In order to keep weevil from attacking the fruit, he suggested the following plan:—"Obtain an old tub and place in it a small quantity of sulphur. On top of the tub place a sieve or a piece of metal gauze, then set alight to the sulphur, so that the fumes will rise through the gauze, and circulate around the fruit. The fruit can then be placed in calico bags and hung up in a dry place."

HOMESTEAD MEETING.—A further meeting was held in Messrs. Green's and Neighbour's gardens on February 26th, when the Orchard Instructor and Inspector for the District (Mr. C. H. Beaumont) was present and delivered an address, "Work in the Orchard and Garden."

BLACKWOOD, February 18th.—Mr. A. L. Warren read a paper, "Apiculture," which was followed by an instructive discussion.

CURRENCY CREEK, February 22nd.—An address, "Top-Dressing of Pasture Lands," was given by Mr. S. R. Cockburn, and a keen and interesting discussion followed.

KANGARILLA, February 22nd.—Mr. S. Smith, of Meadows, attended the meeting and delivered an address, "The Foot of the Horse." The lecturer dealt with the shoeing of the foot, and touched upon some of the common troubles of the feet. Shoes of various designs were exhibited by the speaker and an instructive discussion followed.

PORT ELLIOT, February 23rd.—Mr. F. G. Ayres gave an instructive address, "Dairying." At the conclusion of the meeting it was decided that a branch of the Dairymen's Association should be formed at Port Elliot.

SOUTH-EAST DISTRICT.

KALANGADOO WOMEN'S (Average annual rainfall, 33in. to 34in.)

February 9th.—Present: 12 members.

VEGETABLES AND HOW TO COOK THEM.—The following paper was read by Mr. D. W. Tucker:—"The important part that vegetables play in connection with our health cannot be too highly emphasised. Root vegetables are not so highly recommended as green topped vegetables, because they contain more iron and flesh-forming constituents, especially spinach and cabbage. Green peas are more easily digested than dried peas, although less nourishing; the same applies to fresh and dried fruits, so that they both need more boiling or steaming than the fresh article. Celery is one of the best foods, and it can be used in soup as well as eaten in the raw state with bread and butter. Lettuce is another very useful vegetable on account of its saline properties. Onions are amongst the best vegetables for health purposes, and should be consumed more freely than is often the case. They can be prepared for use in so many ways—as flavoured for dressing geese and ducks and as onion sauce. Most people are very fond of potatoes, yet they are the least nourishing and contain more starch than any other vegetable. They are not good for children unless plenty of milk, butter, or cream is added to them when they are being mashed in order to make them more nourishing. Carrots and parsnips should be steamed in a steamer, because baking in the stove is inclined to toughen them; the skins can be easily removed after cooking by rubbing with a coarse cloth. Old potatoes are more wholesome if prepared in this way, because the nutritive qualities are retained in the skins. New potatoes are not too well spoken of, and should be eaten with care. To

cook them add cold water with a little salt and boil for 10 minutes, pour off nearly all the liquid, and return to the stove again and finish cooking by steaming. This allows the potatoes to remain whole. Remove the skins before cooking. Otherwise scrape before cooking. If one has to lay root vegetables, they can easily be kept quite fresh for some time by covering them with wet earth or wet bags. Peas and beans can also be kept fresh by putting them into wet bags and keeping them in the shade. Cabbages and cauliflowers will remain quite fresh if a round hole is cut in the stalk and kept filled with water; and placed face down in a cool cellar. Lentils can be used plentifully in soups, and half a pound of lentils is equal to a pound of meat or three eggs, and they are not so heating to the blood as meat and split peas. The egg-plant is a very valuable form of vegetable. It can be sliced and fried in butter and put on toast or served with vegetables. All green vegetables should be cut in the early morning, and to get the best results they should be soaked an hour in salt and water to remove grit and insects before being cooked. Boiling water in which salt and a little carbonate of soda has been added should be ready, and into this the cabbage or cauliflower should be dropped and boiled rapidly with the lid off the saucepan. Use only the white stalks of silver beet and leaves of spinach. Add salt to boiling water and boil gently. If the cabbage is old, a teaspoonful of vinegar will assist in making it tender. Old green peas or beans can be treated likewise. A little mint should be boiled with peas. Skinless peas can be prepared in the same way as French beans. Young broad beans are cooked in the same way. Sugar, if used instead of soda when cooking young beans, and served with white sauce, adds to the palatability of these vegetables. All root vegetables should be started in cold water and gently brought to the boil with the lid on, otherwise they will be tough. Carrots and parsnips if boiled should be scraped with a sharp knife. Turnips, kohl rabi, and rutabagas should be peeled rather thickly, because there is often a woody fibre just under the skin. Pumpkins and marrows should be peeled, seeded, and cored, then cut into square blocks, and either boiled, baked, or stuffed with bread crumbs and onions, which makes a delicious dish. Beetroot and rhubarb are very beneficial to health. The former should be well scrubbed, care being taken not to cut too near the bulb to cause it to bleed, then well boiled, the skin is removed, the root sliced, and each layer sprinkled with salt. Finally, the beet is covered with vinegar. Rhubarb is highly recommended because it acts as a cathartic.

PENOLA (Average annual rainfall, 26.78 in.).

March 1st.—Present: 10 members.

HAND-FEEDING OF SHEEP.—The following paper was contributed by Mr. F. Kidman:—"To obtain the full benefit of sheep in the South-East, hand-feeding is necessary when feed is scarce. From September until late in the summer months every farmer, as a rule, has too much grass or feed, and for the remainder of the year after the first autumn rains until the early spring the feed is very scarce. If the lambing ewes are fed, the remainder of the flock will be allowed more grass. The best method is to start feeding the ewes a few weeks prior to lambing, and after a few days the sheep will become very quiet and come to the feeders at feeding times. Under such conditions, hand-feeding will prove a paying proposition. Last winter, which was an exceptional one, I did not lose any lambs from hand-fed ewes, but in one paddock where the ewes were not hand-fed I lost fully 50 per cent. of the lambs that were dropped during the cold and squally weather. In one case I hand-fed 50 ewes, commencing feeding from April 1st, and continuing for a period of 75 days, allowing 1 lb. of barley daily to each sheep. The sheep were running in a small paddock, which allowed them to pick up a little roughage. With barley at 3s. per bushel, it cost 4s. 6d. per sheep for the 75 days. These ewes had 48 lambs. I also had 50 ewes of the same flock running in a paddock on natural grass. This flock was not hand-fed and only dropped 38 lambs. The hand-fed ewes cut 1 lb. of wool per head more than the grass-fed ewes, while the lambs that received the grain ration cut 1 lb. of wool per head more than the other lambs. The simplest plan to adopt when commencing to hand-feed is to shut up, say, a dozen sheep in a small yard, and when they are hungry, tip a little grain in the yard and they

will soon commence eating. So soon as they have made a start, put in a small feeder, in order that the sheep will become accustomed to it, then each day a few more sheep can be added. The flock can be turned out into a grass pasture each night, and fed night and morning with a small ration. When the whole flock is accustomed to the artificial feeding, then the whole flock can be hand-fed. I have tried several different rations for the sheep; 2lbs. of chaff per day mixed with $\frac{1}{2}$ lb. of barley or oats; but in the wet weather the sheep do not care for chaff when it is wet, and in windy weather the chaff blows out of the feeder into the wool. The simplest method is to feed on grain; there is no waste, and a sprinkling of salt with the grain or chaff assists in keeping sheep in good health. A good feeder can be made with bags. Split the bags lengthways, and then run two pieces of wire through the edges; put in pegs about 6ft. apart, running the wire through the bags. Have wooden spreaders about 5in. wide, 3ft. apart, the whole length of the trough. Fifteen bags will make a feeder that will easily accommodate 60 sheep. A farmer who makes up his mind to put 10 acres of oats or barley each year to harvest the grain for his ewes will find it very profitable. The crop should yield 300bush., which would feed 200 ewes for two and a half months." In the discussion that followed, Mr. Hinz asked whether whole or crushed grain was fed, and whether carting out sheaves of hay and allowing the sheep to eat off the heads and giving the balance to cattle was a good method. Mr. Kidman stated that it was not necessary to crush the grain. If sheaved hay were used, a very large quantity of it would be destroyed. Hay was more expensive than grain. Mr. Miller thought that where top-dressing of pastures was adopted, it would not be necessary to hand-feed. He pointed out, however, that whilst grass, &c., was growing, hand-feeding would be necessary in winter, especially for lambing ewes.

TANTANOOLA.

March 1st.—Present: 12 members and two visitors.

HERD TESTING.—Mr. R. Campbell (Hon. Sec.) contributed the following paper dealing with this subject:—"As it is now becoming a general rule for cheese and butter factories to buy milk on butterfat content, it behoves suppliers in their own interests to raise the quality of their product above the medium line. This can only be done by a stringent culling of the herd, and saving only to fill the blanks, or to increase the number from proved and tested good milkers, and by using bulls of known and guaranteed milking strains. Taking the usually accepted 3.6 per cent. as the standard at 9d. per gall., each point beyond this butterfat content represents $\frac{1}{4}$ d. per gallon extra; thus on this basis milk showing a 4.2 per cent. fat content would be worth 10 $\frac{1}{4}$ d. per gallon. The present haphazard method of judging the quality of a cow by the quantity only of her milk is a most unreliable one, for many cows of large yielding capacity are poor yielders of butterfat. The writer has before him several sheets of members of the Glencoe Herd Testing Society, the test ranges from 6.6 per cent. to 3 per cent. on the morning test, and from 6.9 per cent. to 3 per cent. for the evening test. Needless to say the highest two yielders are cows that are drying off, and the other only just in, but both of the best cows are good yielders in the spring months. To have milk tested occasionally is neither a satisfactory nor a reliable practice on which to base calculations for the whole herd. The writer had a case brought under his notice when a cow in a certain herd was tested and gave a 6 per cent. test, yet the factory test for the whole supply was only the normal 3.6 per cent. The only reliable method is to put the whole herd to the test. Not everyone has the time, the knowledge, nor the inclination to do this, so the only alternative is to form a Herd Testing Society, and pay someone who understands the business to do the work. There are several societies operating south of Adelaide. In the society at Murray Bridge, Mr. C. Morris's herd of Holstein cattle took the first prize recently. During the season the herd yielded an average of 363.87lbs. of butterfat from 914,912 lbs. of milk. Three years hard culling brought this herd up to this high standard of excellence, which is approximately 200galls. per cow more than it was at the beginning, representing £8 6s. 2d. per head for the whole herd. The writer believes that a Herd Testing Society in this district would be a good thing. In any case, in his opinion, there is much room for improvement in local herds."

